The University of Chicago

MILL'S LOGIC OF THE MORAL SCIENCES

A STUDY OF THE IMPACT OF NEWTONISM ON EARLY NINETEENTH CENTURY SOCIAL THOUGHT

A DISSERTATION SUBMITTED TO THE FACULTY
OF THE DIVISION OF THE HUMANITIES IN
CANDIDACY FOR THE DEGREE OF DOCTOR
OF PHILOSOPHY

DEPARTMENT OF PHILOSOPHY
1931

BY
ALBUREY CASTELL

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ABSTRACT OF THESIS

TITLE: Mill's Logic of the Moral Sciences: A Study of the Impact of Newtonism on Early Nineteenth Century Social Thought

MILL'S PROJECT: "A science of human nature and society"

REASONS FOR HIS INTEREST IN THIS PROJECT:

(1) His interest in concrete social problems

(2) The influence of

(a) Bentham: a scientific jurisprudence

(b) Ricardo: a scientific economics

(c) Mill Sr.: a scientific psychology

(d) French philosophy of history; a scientific sociology

(3) Macaulay's Critique of the Utilitarian Method in Political Theory

MILL'S TWOFOLD PROBLEM:

(1) Do social and moral phenomena exhibit uniformities?

(2) Are the methods of the physical sciences adapted to detecting these uniformities?

MILL'S EXAMINATION OF THE "LOGIC" OF THE PHYSICAL SCIENCES:

(1) Influence of

(a) Whately

(b) Herschel

(c) Whewell

(d) Newton

(2) Concepts used in the physical sciences

(3) Methods used in the physical sciences

MILL'S APPLICATION OF THIS "LOGIC" TO THE MORAL SCIENCES:

(1) The articulation of the moral sciences:

(a) The science of human nature

- psychology
- ethology

(b) The science of society

- general sociology
  - -social statics
  - -social dynamics
- particular social sciences
  - -political economy
  - -political ethology

(2) The central methodological problem

(3) The methods of the moral sciences
  (a) Rejection of the "chemical" and "geometrical" method
  (b) The concrete deductive method
  (c) The inverse deductive method
(4) Two philosophical problems created by a science of human nature and society
  (a) Freedom
  (b) Selection of ends

MILL'S PROBLEM IN RETROSPECT:

(1) With regard to previous thought
(2) With regard to subsequent thought

INTRODUCTION: THE SCOPE AND PLAN OF THIS STUDY

"The exponents of Mill's logical theory," Miss Stebbing has recently written,[1] "seem to forget the motive that led him to write his Logic. He was interested primarily in the social sciences; he was anxious to discover whether those methods which had been so signally successful in the natural sciences could be applied with equal success to the study of men in society. He accordingly set himself the task of carrying out a critical examination of the procedure which he believed to have been followed by scientists."

This dissertation is an expansion of the perspective implied in Miss Stebbing's remark.[2] It was, indirectly, suggested to me some years ago by Bradley's famous chapter[3] on Mill's canons of experimental inquiry. In the hands of that subtle and merciless dialectician Mill appeared gravely in error, not to say foolish. Nevertheless, it was difficult to feel that Bradley was playing the game. His devastating criticisms are perhaps well taken; but, with Mill, as with so many of the great empiricists--Bacon, Locke, Hume, James, Russell, Dewey--inconsistencies are easily found if one cares to nose them out. But Bradley's rather waspish method of emphasizing Mill's lapses from intellectual rigor ignores the latter's phenomenal power of reflecting, microcosmic-like, the intellectual life of his time. This quality, it seems to me, is no less significant for the history of philosophy than the occasional loose thinking which his work does, undoubtedly, reveal.

What is here presented, accordingly, is almost wholly historical and interpretative. One problem in Mill's Logic--Are the methods of the physical sciences applicable to the data of the social sciences?--is isolated; and the attempt made to connect his discussion of this problem[4] with the rest of the Logic and with the social and intellectual forces which produced it. This, it seems to me, is one fruitful and neglected perspective on Mill's logical treatise. Such a perspective reveals immediately the mirror-like quality, characteristic of so much that Mill wrote, of bringing together problems and conceptions which were occupying what he would have called "the best minds" of his day. To this end, the present study is divided into three chapters: (1)"An Historical Introduction," suggesting the social problems and the intellectual heritage which converged to centre Mill's attention

on this question. (2) "The Logic of Science," providing an inventory of the key concepts which Mill believed to be involved in the "scientific" view of nature and a statement of the three methods available for detecting her uniformities. (3) "The Logic of the Moral Sciences," suggesting the way in which Mill applied the results of his analysis of scientific method (as exhibited in the major physical sciences) to the creation of a kind of "organon" of the moral and social sciences. An appendix to chapter three deals with the problems of freedom and purpose which Mill felt were raised in a rather acute form by the conception of a "science of human nature and society." By way of conclusion, "The Problem in Retrospect," I have indicated, none too clearly perhaps, what I think Mill's chapters may have contributed to the subsequent development of the social sciences.

The part of the paper which seems to me the most significant, and at the same time the least adequate, is the historical introduction. The remainder of the dissertation, derived directly from the pages of Mill's Logic, amounts to little more than a restatement, somewhat rearranged and simplified, of Mill's own ideas. But the thesis advanced in historical introduction cannot be thus documented chapter and verse. For this reason, I venture to repeat here the conclusion I think is borne out by the facts there assembled.

The threefold contention is this: That Mill originally conceived his Logic as a sort of organon of the social-moral sciences; that it grew out of his efforts to determine whether and to what extent the methods of the physical sciences were applicable to what he calls a "science of human nature and society"; and, what would seem to follow as a corollary, the sixth book of his Logic loomed considerably larger in his mind than it has in the minds of most, if not all, of his readers and commentators.

The establishment of this contention would not imply any reinterpretation of the history of British philosophy in the nineteenth century. At most, it might indicate the need for a new chapter in the early history of modern social science. The System of Logic, without its final chapters on the moral sciences, would still be just what it is--a magnificent forerunner of modern inductive logic and scientific methodology. Nor do I mean to suggest that Mill himself regarded his finished treatise as primarily a discussion of the methodology of the social sciences. Had he so regarded it, he would doubtless have given it a different subtitle. The book may well be one more illustration of Vaihinger's Law[5] of the Preponderance of Means over End, of the tendency in that which is adopted originally as a means to become an end in itself. The few facts--there are not many available--brought

together in Chapter I of this study seem to suggest that such actually occurred in the case of Mill's Logic.

There are, it seems to me, four lines of evidence which converge in support of the thesis that Mill's treatise began, at least, as an attempt to determine whether and to what extent the methods of the physical sciences are applicable to the social-moral sciences. (1) A consideration of the social, political, and economic conditions obtaining in England during the years of Mill's adolescence and early manhood reveals a considerable number of problems which, to a mind such as Mill's, seemed to cry aloud for "scientific" treatment. In the preface to his Logic, he says himself that in Book Six he has attempted to contribute toward the solution of a twofold problem which, in "the decay of old opinions and the agitation of European society," presses for consideration; "Are moral and social phenomena exceptions to the uniformity of nature? How far can the methods of the physical sciences be made instrumental to the formation of a moral and political science?" (2) A consideration of the tradition of "social naturalism"--described by M. Halevy[6] with penetrating insight as "Newtonism in the moral sciences"--into which Mill was born and in which he was raised, seems to me to bestow an almost a priori probability on the likelihood that young Mill should attempt an inquiry into the precise nature of scientific method and its availability in the study of human nature and society. I have, accordingly, sketched very briefly the history of three principal lines of social naturalism--philosophy of history, association psychology, political economy--confining my remarks as nearly as possible to the names and ideas which represented this tradition for Mill. (3) A consideration of the major facts of Mill's own life--his education, his reading, his early writings, the ideas of some of his contemporaries--down to about the year 1832, when he first began to work out the ideas which finally took shape in his Logic (published 1843), seems to me to offer in many ways the most unquestionable evidence for the point I am arguing. The early training in logic and economics and psychology; the interest which his early writings reveal in concrete social problems; the "scientific" claims by Bentham and James Mill for their political and social apriorism; the rude shock administered to these claims by Macaulay's Edinburgh articles; the publication of Herschel's treatise on the methods of the physical sciences, hailed exuberantly by young Mill--all seem to me to lend credibility to the rather mild hypothesis that Mill's first piece of serious writing originated in the questions discussed in the sixth book of his Logic rather than in the third; in the issues raised by Ricardo, Macaulay, and Comte rather than by Whately and Whewell. And the

fact that his Essay on the definition and method of political economy, which anticipates clearly the basic contention of his Logic, was published at this time (1830) seems to me more in the nature of proof than evidence. (4) Finally, to mention a point for which no argument is really possible but which occurs to me whenever I open the Logic, it does not seem credible that one who had written the first five books of the Logic without having been moved to do so by the issues raised in Book Six, would ever have written Book Six.

CHAPTER I

HISTORICAL INTRODUCTION

1. Some Social Problems 1800-1840

Mill's chapters on the logic of the moral sciences were written with direct reference to social problems engaging the attention of reformers at that time. His reference, in the preface of the Logic, to "agitations which disturb European society to its inmost depths" was no empty rhetoric. Although he dealt with questions of principles and methods, he was concerned primarily with their application to specific social problems. From his early letters and articles, from biographies of himself and his friends, from the files of the quarterlies, and from histories of the period 1800-1840, it is possible to reconstruct many of these problems which were "disturbing European society to its inmost depths." This is a necessary preliminary to an understanding of what Mill aimed to do. By nature and education he was unusually sensitized to the manifold maladjustments in social, political, and economic conditions. His early writings reveal a constant preoccupation with these problems, and a growing conviction that they were not to be dealt with by rule of thumb but require a "science of human nature and society." His interest in questions of principles and methods, the core of the Logic, was sustained by an even stronger interest in the concrete problems which he saw on every hand.

These social disorders which mark the history of the period 1800-1840 were due, no doubt, to the industrial changes which occurred, especially in England, toward the close of the 18th and the beginning of the 19th century. But it is not sufficient to lump them together as "consequences of the industrial revolution." Such a generalization conceals the multiplicity and diversity of the problems. There were questions of law reform, of prison reform, of parliamentary reform; problems of labor, of slavery, of popular education, of tariff, of overproduction, of freedom for the new popular press; and theories for dealing with these matters which ranged from laissez-faire to state socialism.

One point to be kept in mind with regard to these complicated issues is that they were primarily difficulties of technique.

The ethics of such questions were settled readily enough, at least by the philosophical radicals, on a basis of dogmatic utilitarianism. It was comparatively simple to lay down the rights and wrongs involved. But it was difficult, not to say impossible, to suggest what practical measures should be adopted to realize the rights and eliminate the wrongs. The Tories and Whigs, no less than Bentham and company, agreed that the end was the greatest happiness of the greatest number. But they disagreed on ways and means. And the almost total absence of reliable data and methods reduced all policies to the level of speculation. Mill felt this keenly. How be sure, e.g., that a given piece of legislation will achieve the purpose for which it is designed? The vagueness and uncertainty which characterized the knowledge of social phenomena precluded any effective handling of social disorders. Mill wanted "scientific method" in place of the famous "muddling through." But how determine beforehand the results, e.g., of the corn laws? Of the enclosure acts? Of a ten hour day? How foresee the consequences of substituting imprisonment for physical punishment? Or the secret for the open ballot? What may be expected to follow from an extension of the franchise? From an uncensored press? From abolition of the poor laws? From factory acts? From trade unions? From joint stock financing and limited liability? From Catholic emancipation? Should parliamentary representatives be controlled by their electors? Will free-trade prove better than protection or reciprocity? To what control are trade crises amenable? What can be expected when governments begin to "juggle" currency? What problems are due to the right to bequeath immense wealth? What alternative problems will emerge if this right be suspended? Will local government work better than central control? Generally speaking, when is laissez-faire sounder politics than paternalism?

These questions, which could be multiplied indefinitely, are drawn from Mill's own early papers and letters.[1] They indicate, better than a chapter of description, the motive for his enquiry into the logic of the moral sciences. The accuracy and confidence with which an engineer could estimate the strength of a steel beam or an astronomer predict the path of a planet, contrasted sharply in Mill's mind with the inaccuracy and hesitation which attend the calculations of a statesman. That he hoped to remove at least part of this uncertainty and ignorance by his chapters on what we would term the methods of the social sciences is abundantly clear from his own statements. What he wants, e.g., is the ability

> "in any given condition of social affairs, to understand the causes by which it had been made what it was; whether it was tending to any changes; what effects each feature of its present state was likely to produce in the future; and by

what means any of those effects might be prevented, modified, or accelerated."[2]

In distinguishing elsewhere[3] between two kinds of inquiry peculiar to the "science of human nature and society" he reveals the scientific and utilitarian motives in his conception:

"(1) In the first, the question is, What effect will follow from a given cause, a certain condition of social circumstances being presupposed? What, e.g., would be the effect of imposing or repealing corn laws, of abolishing monarchy, or introducing universal suffrage, in the present condition of any European country? (2) There is also a second inquiry, namely, what are the laws which determine, at any time, the general conditions of any society? Not, What will be the effect of a given cause in a given state of society; but, What are the causes which produce and the phenomena which characterize states of society generally?"

2. The Great Tradition

Mill's enquiry into the logic of the moral sciences drew its inspiration from two sources. The first of these, as already noted, was the manifold social problems present in the England of 1800-1840. These conditions provided the need for some new and reliable method of dealing with matters of unprecedented complexity. The second has been admirably described[4] by Elie Halevy as Newtonism in the moral sciences:

"Le développement des sciences physiques, la découverte du principe du Newton qui permet de fonder sur une loi ni que une science intégral de la nature, et l'espérance de découvrir un principe analogue capable de servir à la constitution d'une science synthétique de phénomènes de la vie morale et sociale."

This hope of formulating the laws which "control" human affairs, as Newton formulated the law which "controls" the motions of the planets, had by Mill's day a long and distinguished history. It was to this tradition of naturalism in social thought that he turned in his perplexity. His chapters on the logic of the moral sciences are an examination of the relevance of the methods of the physical sciences to the problems and data of the major philosophies of history, the association psychologies and the systems of political economy. These were each attempts to work out part of what Mill called a "science of human nature and society." An understanding of this tradition in which Mill worked serves to make clearer what he intended by a "logic of the moral sciences," and at the same time reveals some of the limitations of his work.

(1)

The philosophy of history may be described as the answer to the question, What does a survey of human history reveal beyond the mere succession of events? Do the details of history point beyond a mere chronology of themselves? The philosophy of history, so defined,[5] developed principally in France (from Bodin to Comte) and in Germany (from Leibniz to Marx). Mill was more familiar with the French than with the German tradition. In France the question took the form, Does a survey of the details of human history reveal the presence of any laws "controlling" the phenomena of group life? Does history suggest that human nature and society are "subject" to laws? Does history provide data for and point to the possibility of a "science of human nature and society"?

By Mill's time the philosophy of history was a well established tradition going back at least to Bodin's Method for the easy understanding of history (1566) and Six books of the republic (1576). Each of these works contains, in undeveloped form, the theory of geographical determinism elaborated later by Montesquieu and Buckle. Bodin's thesis was that history shows human nature and social organization to be a function of the physical environment:[6] "Even as we see a great variety in all sorts of beasts, and in every kind some notable alteration for diversity of regions; in like sort we may say that there is as great difference in the nature and disposition of men as there is of countries." A few sentences indicate sufficiently the kind of correlation he intended.[7] "The people of the north have force, with bigness and beauty of body and little wits; contrariwise, the southern nations are weak, small, dark and have great wits." Seasonal changes in temperature have effects similar to differences in latitude; and humidity intensifies the effects of heat. More narrowly, "the natures of the people of the north, of the south and of them that are betwixt both, are like unto young men, old men and them of middle age. In like sort, each people useth in government that which he hath most at command: the nations of the north, force; of the middle regions, equity and justice; of the south, religion." Because of their physical environment "the people of the south are adapted to the search for hidden fancies; those of the north, to labor and manual arts; and those of the middle regions, to negotiate, traffic, judge, plead, command, and make laws." The double motive of Bodin's speculations, present also in Mill's work, was the conviction that the phenomena of human nature and society exhibit determinable laws and that a knowledge of these laws is necessary to effective social control. Thus, Bodin: "Let us show what may be peculiar to some peoples to the end that we may accom-

modate the ordinances of man to the laws of nature, whereof many have had small regard, striving to make nature obedient to their edicts and so troubling, yea ruining, great estages."

Montesquieu's Spirit of laws (1746), since it is only a more careful elaboration of Bodin's general thesis, may be passed over without any extended comment. Like Bodin, he was concerned primarily with what he would be pleased to call facts. Neither raised questions of method. Three conceptions which Mill gathered up into his account of the logic of these enquiries received what was perhaps their earliest formulation in Turgot's Successive advances of the human mind (1750). These were the conceptions of (1) social progression, elaborated later by Condorcet, (2) social consensus, and (3) the law of the three stages, elaborated later by Comte. As these notions remain central to all later philosophy of history in France, they require some explanation. The term "social progression" is used to contrast the cyclical changes of vegetable and animal life with the cumulative change recorded in human history. Because of the capacity to learn from the experience of predecessors, because of the fact of transmission of social customs and institutions, human history is a record of cumulative instead of cyclical change. Progression must not be confused with progress or progressiveness. Turgot and Condorcet did, it is true, argue from the obvious fact of social progression to an obscure and debatable necessity of social progress. Hence their belief in the "infinite perfectability of man." Mill was later to insist that progression need not be improvement. The term "social consensus," Mill's uniformities of coexistence, and the subject matter of Comte's "social statics," denote the perpetual reciprocity of influence between all the elements in a social organism; the constant action and reaction of social phenomena on one another; the functional relation between any social fact and the social whole of which it is a part. The human tendency to account for natural phenomena on theological, metaphysical, and positive principles successively (Comte's law of the three stages) is explicitly noted and described by Turgot.[8] Mill refers these three conceptions to Comte. It is difficult to know whether he was aware of their earlier formulation by Turgot.

Condorcet's Essay on the progress of the human spirit (1793), like Montesquieu's Spirit of laws, may be noted in passing as the locus classicus of an idea advanced by an earlier thinker. His paean and prophecy turn largely on the conception of social progression. His enthusiastic inference from progression to progress calls for no comment in this connexion.[9] A conception of more significance, however, is to be met in Saint-Simon's theory of the critical and organic periods in history. This generalization

from the details of history is to this effect:[10] The human mind works by analysis and synthesis, from particular to general and vice versa, by a posteriori and a priori inference. (The combination of both he proposed to call The Descartes!) Societies, like individuals, employ sometimes analysis, sometimes synthesis; and this determines whether the epoch which they pass through will be critical or organic. The critical periods are those in which institutions and principles of government are submitted to critical analysis with the view of amending or replacing them; in which no creeds command general assent; in which, as a result, society is without principles, discontented, changeful, anarchic. The organic periods are those which possess an accepted philosophy of things, in which society is cemented by the synthesis of a common faith, in which institutions and principles afford general satisfaction. Pre-Socratic Greece was organic. Post-Socratic Greece was critical. Rome prior to Lucretius and Cicero was organic. And so on, down the centuries. His own age Saint-Simon held to be critical, and felt that the great need was a new synthesis.

Comte's philosophy of history, in which so much previous thinking was brought together, elaborated, given new terms, and presented as the final synthesis of systematic generalizations from history, contributed most to the formation of Mill's own ideas along these lines. The hierarchical classification of the sciences seems, however, to have been the major thesis original with Comte. This generalization from the history of thought was to the effect that the sciences have matured, broadly, in order of their dependence one upon another. The conclusions, e.g., of chemistry constitute many of the data of biology. Progress in the latter depends upon progress in the former. The conclusions of all the sciences--mathematics, astronomy, physics, chemistry, biology--constitute the data of the last science to attain positive conclusions, namely, sociology.

The purpose of the above thumb-nail sketch is to indicate in very general terms (1) the relation between the traditional philosophy of history and Mill's projected "science of human nature and society"; (2) the general field in which he was raising questions of principles and methods. In his chapters on the logic of the moral sciences he was not concerned directly with the truth or untruth, e.g., of Bodin's theory of geographical determinism or Condorcet's theory of the infinite perfectibility of human nature of Comte's law of the three stages. The emphasis is primarily methodological, on principles of investigation and verification in these fields. By what method, e.g., did Vico or Turgot or Saint-Simon arrive at their generalizations from history? By what methods may such conclusions be verified?

(2)

Another phase of what Halevy has called Newtonism in the moral sciences was represented by the attempt of British association psychologists, especially from Hume to James Mill, to formulate the laws which "control" the come and go of ideas or "mental states." As Mill was born and bred in this tradition, and as it loomed so large on his mind as the germ of a complete "science of human nature," it seems desirable to indicate the key conceptions elaborated by Hartley, Brown and others. The earliest explicit statement of the central thesis of modern association psychology occurs in Aristotle's Dememoria, where it is noted that the links in chains of thought which end in the recollection of particular facts, are held together by one or other of three connecting principles, namely, similarity, contrast, and contiguity. Aristotle's suggestion bore little fruit until it was grafted onto the opening pages of Hobbes' Leviathan, where it formed the starting point of English associationism.[11] No significant use was made of the conception of association by Locke or Berkeley. Hume was perhaps the first after Aristotle to attempt a thorough classification of the modes of association. He claims entire originality:[12] "I do not find that any philosopher has essayed to enumerate all the principles of association." He argues for "only three principles of connexion among ideas, namely, resemblance, contiguity in time or space, and cause or effect." A point of more significance in his connexion is the influence of Newtonism revealed in the subtitle of his book, "an attempt to introduce the experimental method of reasoning into moral subjects." A few sentences in the early pages of his Enquiry indicate that double interest in the possibility of "moral sciences" which led Mill to examine their logic.

> "May we not hope to discover, at least in some degree, the secret springs and principles by which the human mind is actuated in its operations? Astronomers had long contented themselves with proving, from the phenomena, the true motions of the heavenly bodies, till one arose who seems to have also determined the laws and forces by which the revolutions of the planets are governed. The like has been performed with regard to the other parts of nature; and there is no reason to despair of equal success in our enquiries concerning the mental powers and economy. It is probable that one operation and principle of the mind depends on another, which again may be resolved into one more general and universal."[13]

The utilitarian implications are also recognized: from a science of human nature "the politician will acquire greater foresight and

subtilty in the subdividing and balancing of power; the lawyer more method and finer principles in his reasoning; the general more regularity in his discipline and more caution in his plans; and the stability of governments will probably improve."

The epistemological conclusions of Hume's Treatise, particularly his analysis of the ideas of cause as necessary connexion, and of liberty and necessity, were taken over by Mill and, as we shall see later, brought to bear on the question of free will which seemed to preclude any possibility of a scientific treatment of human nature and society.[14]

Associationism received its first systematic exposition in Hartley's Observations on man (1749) published just ten years after Hume's Treatise. In Hartley's hands, association of ideas was given physiological interpretation: the connexions among ideas is held to be based on vibrations in the small particles of the white medullary substance of the brain, cord, and nerves, occasioned by external objects impressed on the senses. He proposed, in the introduction to the Observations, to lay down the general laws according to which sensory, ideational, and motor phenomena come about. With the particulars of this program we are not concerned, beyond noting (1) that his theory of a physiological basis of association of ideas forced him to reduce the principles of association to contiguity in time, (2) his attempt to broaden the conception of association by including motor as well as sensory phenomena.

Hartley's simplification and extension of the doctrine of association gave it a prestige with the scientific imagination which persists even today: we have merely exchanged his term "association" for the behavioristic term "conditioning." The alacrity with which it was applied to special topics by a number of thinkers immediately following Hartley, bears witness to the hold which it secured on later 18th century thought. It was used by Adam Smith (in his Theory of moral sentiments, 1761) and by Abraham Tucker (in his Light of nature pursued, 1768) as the basis for a theory of the formation of moral ideas; by Joseph Priestly (in three essays prefaced to an abridged edition of Hartley's Observations, 1775) in tracing out the elements of a number of complex ideas such as force, time, right, wrong, etc.; by Jeremy Bentham (in his Principles of morals and legislation, 1789, and his Table of the springs of action) as the basis for a scientific jurisprudence; and by Archibald Allison (in his Essays on the nature and principles of taste, 1790) in an examination of the "feelings" of beauty, sublimity, ugliness, etc., which he attributed to "associations of ideational terms with sensations." These applications of the principle of association made by Mill's predecessors and older contemporaries were responsible, no doubt, for

the central rôle which he assigned to that principle in the general science of human nature and society whose methods of investigation and proof he aimed to formulate.

The second elaborate statement of association psychology was made by Thomas Brown in his Lectures on the philosophy of the human mind (1820) published when Mill was fourteen and read by him when he was seventeen.[15] The significant novelty in Brown's associationism, the point wherein he differed from previous and later psychologists, is implied in his use of the term "suggestion" instead of association. Hartley, it will be remembered, based mental association on physiological conditioning. Brown restricted himself to mental phenomena alone, aiming to describe the association of ideas in purely mental terms, with no reference to physical or physiological concomitants. This required none of Hartley's simplicity in formulating the laws of association, but it enabled him to deal more adequately with many association phenomena. The principle of contiguity in time he retained as fundamental; but he supplemented it by three "primary" and nine "secondary" laws. The primary laws were Aristotle's resemblance, contrast and contiguity. The secondary laws, which modify the influence of the primary laws by inducing one association rather than another "were relative duration, liveliness, frequency, recency, previous co-existence with fewer alternatives associates, constitutional differences, variations and prior habits." Brown's doctrine of "mental chemistry" (our "fusion") was a third contribution to associationism which was taken over by the Mills and Bain. The term referred to a phenomenon, noted earlier by both Tucker and Priestly: "From the combination of ideas there may result ideas so different from the component parts that they are no more analysable than the idea of white is analysable into the colors of the spectrum" (Priestly).[16] "In this chemistry of the mind, the compound that results has in many cases so little resemblance to its constituents that it requires the most attentive reflection to separate them out"(Brown).[17]

The third detailed exposition of associationism was made by Mill's father in his Analysis of the human mind (1829), which will be considered in later pages devoted to Mill's education and early activities. These notes on the development of association psychology have the same purpose as those on the philosophies of history: to indicate the tradition in which Mill worked and the general field denoted by the "moral sciences" whose "logic" he set himself to examine.

(3)

The third form of social naturalism which Mill included in the scheme of a general science of human nature and society was the attempt to formulate the laws which "control" the production and distribution of wealth.

Economics, so defined, may be traced back at least to the days of Sir William Petty's Political Arithmetick (1655). The scope of the subject, at that stage, is revealed in the title. Political arithmetic was the attempt to lay down general principles for calculating and controlling "the wealth of nations." The more dignified term "political economy" points to a similar interest: a body of working principles, analogous to domestic economy in the household, to guide the policies of statesmen and governments in such matters as trade balance, import duties, taxation, bounties, etc. Although the enquiry became increasingly abstract and theoretical in the writings of successive economists, its problems and concepts more precisely defined and its transcript of the economic order more "mechanistic," it continued to reflect this practical interest till Mill's day and for some time after. Nothing could be more "Newtonian" in spirit than the speculations of the French physiocrats, in which the production and distribution of the annual wealth of a nation was traced from its origin in the agricultural net product through the channels of exchange afforded by manufacturing, trading, and rent receiving classes back to the agricultural class where it began again. This rather fantastic "tableau economique" did not become an integral part of the classical economics developed in Great Britain by Smith, Malthus, Ricardo, and the elder Mill; but it reflected the same conviction that economic laws "control" economic phenomena just as surely as physical laws "control" the motion of matter in space.

Smith's Enquiry into the causes of the wealth of nations (1776), aside from its admirable concreteness and detail, is significant in this connexion for its elaboration of five conceptions which became basic to the general attempt to work out an economic science. The first of these was the structure of the economic order as Smith conceived it; capitalists, landlords, and laborers, with the consequent channels of distribution--interest, rent, and wages. This conception clarified the general problem of an economic science as worked out by Ricardo: to determine the laws which "govern" what portion of the national wealth becomes interest, rent, and wages. The second point was the dynamic rôle assigned to human labor in the production of wealth, and the further insistence that the productivity of labor is increased in proportion to the minuteness of its division. This introduced into economics the possibility of a functional analysis roughly analogous to functional concepts in the physical sciences. The third, fourth, and fifth points go more or less together: (a) the the principle of economic hedonism (that each individual in society seeks to further his own interest at the minimum cost of

effort), (b) the principle of identity of interests (that in so doing, the individual most effectively increases the general welfare), (c) the principle of laissez-faire (that in view of [a] and [b] , governmental interference in economic affairs is unsound). These conceptions and assumptions remained basic to later developments in classical economic theory. They lie at the heart of the tradition which Mill inherited from his predecessors.

Malthus' Essay on population (1798-1803) introduced a notion which made possible a correlation and functional analysis of certain economic phenomena and problems which, prior to it, had been either ignored or misinterpreted. Rent, e.g., had been regarded by the physiocrats and (in passages) by Smith as "nature's contribution to man's labor." Malthus' doctrine of population pointed directly to a restatement of this optimistic theory, in which rent was reinterpreted as a function of the density of population.

The "iron laws" of economics received their first systematic exposition in Ricardo's Principles of political economy and taxation (1817). The details of this treatise do not require restatement here. It was, roughly, the attempt to deduce from premises and doctrines stated or implied in the writings of his predecessors, the laws which "govern" the rate of wages, interest, and rent, and to infer from these deductions the economic policy incumbent on any government which aimed to maintain the maximum prosperity of its subjects. James Mill's Elements of political economy (1821) was, by its own profession, only a restatement in clearer terms of the ideas contained in Ricardo's Principles.

By the time Mill set himself to examine the logic of the moral sciences, the methods and conclusions of the British economists were accepted as outstanding examples of the "scientific" treatment of one group of social phenomena. Political economy, as reasoned out by Ricardo, not only provided Mill with the reassuring conviction that a science of society was a possibility; it also offered him his strongest argument for insisting on the deductive procedure proper to social enquiry.[18] Newton and Ricardo, between them, by their apparent success in applying scientific method to the fields respectively of physical and economic phenomena, may be taken to symbolize the source from which Mill derived both the inspiration and his methodological problems.

These introductory pages have dealt so far with two general problems. (1) Why Mill felt the need for a science of human nature and society: the social and political problems in England during the early years of the 19th century which seemed to him to require "scientific" treatment. (2) What general fields of enquiry were covered by the moral sciences as developed by his predecessors:

the tradition of social naturalism in which he worked. There is a third historical problem to be considered: Why did Mill choose to examine the logic of the moral sciences rather than investigate some of their concrete problems? Why do his chapters on the moral sciences form the conclusion to a treatise on logic instead of the introduction to a treatise on social problems? More concretely, why was that preoccupation with social questions which is revealed in his early articles and letters replaced by an interest in questions of scientific method?

3. Mill's Development to 1831

The reality of this shift in emphasis, and the explanation for it, is to be found in a consideration of the details of Mill's biography up to about 1830. His education and early environment were, from the first, such as would fit him to deal later with questions of reform and control. He was systematically coached in those disciplines which are even yet valuable prolegomena to reflective consideration of moral and social problems.

During the years 1809-1814 (aged three to eight) he acquired the rudiments of arithmetic, Greek, and "world" history.[19] The record of his reading for these five years included (1) in the Greek: Xenophon's Anabasis, Cyropedia and Memorabilia; Herodotus' History, parts of Diogenes Laertius, two speeches of Isocrates, and "the first six" of Plato's dialogs; (2) in English: the histories of Gibbon, Hume, Robertson, and Rollin; Watson's Philip the Second and Third; Hook's History of Rome; Langehorne's Plutarch; Burnet's Own Times. To these must be added, on general subjects, Millar's On English Government, McCree's Knox, the Voyages of Anson and Cook, Cervantes' Don Quixote, and other pieces of imaginative literature. If the Autobiography is to be trusted, the books were read with as much thoroughness as his childish powers permitted.

During the years 1814-1818 (aged eight to twelve) he mastered the elements of algebra, geometry, and (less thoroughly) calculus, and acquired a reading knowledge of Latin. His schedule of supervised readings included Livy, Sallust, Cicero, Thucydides, Demosthenes, Polybius, and Aristotle (the Rhetoric). In private work, i.e., not under the immediate direction of his father, he studied Mitford's Greece (warned by Mill senior against its ultra-Tory prejudice), tried to compose a history of Roman government (based on Livy, Dionysius, and Hooke), began reading in the literature of the natural sciences, and browsed about among the English poets.

During his twelfth and thirteenth years he began the study of logic and political economy. The painful thoroughness with which this work was done is familiar to anyone who has read the Autobiography. The works covered include Plato's Gorgias, Protagoras, and Republic; Aristotle's Topics and Prior Analytics; "latin treatises on scholastic logic," and Hobbes' Computatio sive logica, for logic; Ricardo's Principles, and portions from Smith's Wealth of Nations, for economics.

Beginning with 1818 he maintained very close contact with the content of the books and articles produced by his father. In that year he copy-read the whole of the latter's History of British India. A year later, the elder Mill's articles on Government, Jurisprudence, Liberty of the Press, Law of Nations, Prisons and prison discipline, Education, Beggars, Benefit Societies and Savings Banks were published in the Encyclopedia Britannica. With each of these, and the general field of problems which they represented, young Mill was made as familiar as his age and education permitted. From a stay in France (the next year) with the Benthams he acquired "a strong and permanent interest in continental liberalism." On his return to England he was given the task of proof-reading and providing marginal analyses for his father's Elements of political economy. At the same time he began a course of intensive reading in the classics of the utilitarian tradition, which included Dumont's Exposition of Benthamism (Traité de legislation), Condillac's Traité de sensation, some histories of the French Revolution, a treatise on Roman law, Blackstone's Commentaries, Locke's Essay, Helvetius' De l'esprit, Hartley's Observations on Man, and Bentham's Analysis of the influence of natural religion on the temporal happiness of mankind.

This record brings Mill to his sixteenth year. After this date his formal education under his father's supervision was replaced by more general influences which were important, none the less, in forming his opinions and controlling his interests. In 1822 he made his first appearance in print. Colonel Torrens, the economist and newspaper owner, had criticized some point in the Ricardian economics in the columns of his journal, The Traveller. Mill wrote two letters in reply, defending Ricardo. These were published by the colonel in his paper. In the next year Mill was appointed to a clerkship in the India House. The same year young Mill formed a discussion group of kindred spirits who dubbed themselves The Utilitarian Society, "after a clergyman in Galts' Annals of the Parish who warned his parishioners not to leave the Gospel and become utilitarians." This group, which included Bentham's secretary, met fortnightly for three years to read and discuss papers "conformably to the principles of Utility." In the

same year, 1823, Mill made his second bow to the reading public, this time in the columns of the Morning Chronicle, protesting against the government prosecution of one Richard Carlisle and family "for publications hostile to Christianity." These three letters gave him further access to the paper, of which he proceeded to avail himself by writing reviews and short articles on defects in the law, administration of justice, affairs in the House of Commons, etc. Still in the same year, Bentham founded the Westminster Review to serve as the organ for those "radical" principles which were denied expression in the Edinburgh Review and the Quarterly. For the first number Mill senior wrote a general criticism of the politics of the Edinburgh Review. Before doing so he set John Stuart to read through all volumes of that journal and make notes for him of such articles as seemed pertinent to the project. The Quarterly came in for similar treatment the following year.

From this point forward, the most revealing facts about Mill's intellectual growth are the papers which he contributed to several of the "quality" journals. At the risk of some tedium, these must be noted, if only by name. They indicate, more clearly than chapters of description, the extent to which he was engrossed in the concrete social, economic, and political issues of his day.

In 1824 (aged eighteen) he published articles on (1) Edinburgh Review, (2) religious persecution,(3) war expenditure, (4) Hume's misrepresentations in his History, (5) Catholic disabilities, (6) the commercial crisis, (7) currency, (8) the reciprocity principle in commerce, (9) the political economy of the Quarterly Review,(10) the law of libel, (11) game laws. The following year he"prepared" the manuscript of Bentham's Rationale of judicial evidence for the press. When it is understood that preparing a Bentham manuscript meant almost writing it out from sheafs of jottings made by "the master," the extent of the task is seen in somewhat better perspective. It does not appear that Mill published anything that year. His energies were engaged elsewhere. He took part in two protracted debates in the Owenites Co-operative Society on population and on the principles of Owenite socialism. He began, with a group of young enthusiasts, a series of morning readings at the home of George Grote, the future liberal historian. These meetings occurred twice a week and lasted from 8:30 A.M. to 10:00 A.M. One of them read aloud a chapter from the book they were examining. Discussion followed. In this fashion, during the next four years, they worked through treatises on political economy, logic, and psychology. The titles are sufficient: for economics they read James Mill's Elements of political economy, Ricardo's Principles of political economy and taxation, and

Bailey's Dissertations on value; for logic, Aldrich's Logic, Du Trieu's Manuductio ad logicam, Whately's Logic, and Hobbes' Computatio sive logica; for psychology, Hartley's Observations on man, and James Mill's Analysis of the human mind. The significance of these exercises for the future enquiry into the logic of the moral sciences is evident without remark. Still in the same year (1825) Mill was instrumental in forming the Speculative Society, a much more pretentious affair, involving several young luminaries from Oxford and Cambridge. The story of this enterprise, told in vivid terms by Mill himself in his Autobiography, is irrelevant here, beyond noting that it afforded him further opportunity for mastering the details of then current questions in politics and social philosophy; and that, by bringing him in touch with young Maurice and Sterling, it marked the beginning of his sympathetic absorption of the ideas and values held by thinkers so alien to the utilitarian tradition as Coleridge and Wordsworth.

In his twentieth year (1826) the drain on his health and strength made by the abnormally active program of the past few years brought about what Mill calls his "mental crisis." It took the quite understandable form of persistent doubts of the value of the tradition in which he had been trained and of the values he had himself come to cherish. For a few years, like many other young men, he "drifted"; that is, he was unable to center his energies in any convictions about what things are and are not worth while. During the few wanderjahre, his literary output was substantially less. In 1826 his father published three major articles: (1) ecclesiastical establishments, (2) the formation of public opinion, (3) the state of the nation; and he himself published an article on the corn laws and reviews of Mignet's French Revolution and Sismondi's Histoire de France. The following year (1827) he reviewed Godwin's Commonwealth and Whately's Logic. The latter long and withal appreciative review of what was for many years a standard text in syllogistic logic, points to developments of the coming ten years. In 1828 he began his fourteen years' correspondence with Gustav D'Eichtal; began also the study of Wordsworth and Comte; reviewed Sir Walter Scott's Life of Napoleon; attended Austin's lectures on jurisprudence; and was promoted to be assistant examiner in the India office.

The year 1829 marks a turning point in Mill's intellectual biography, and the beginning of his first serious interest in questions of method in the social sciences. Thus far he seems to have been wholly immersed in the details of concrete social problems. This strong sense for the realities of social problems he at no time lost. But the next ten years or so were to see the theoretical problems involved in any social science loom increasingly larger in

his mind. The direct cause of this shift in his interest were two reviews by Macaulay of his father's Encyclopedia articles.[20] James Mill's contributions to the 1820-21 supplement of the Encyclopedia Britannica had been republished in volume form under the general title Essays on government. They had thus been before the public for some eight years, when Macaulay singled them out as examples of all that was bad in the Utilitarian camp. With James Mill's politics and Macaulay's objections to them, this paper is not concerned. The point of interest is the method by which Mill senior established his conclusions. Everything is "deduced" or "reasoned" from a conception of human nature. The celebrated article on government, typical of so much of the man's methods and opinions, may, without any injustice be paraphrased and condensed as follows:

> The science of government must rest on the science of human nature. It is a law of human nature that men seek pleasure and avoid pain at as little effort to themselves as possible. In this pursuit of pleasure and avoidance of pain men will infringe on each others' "rights," and, by whatever means possible, subject others to their will. Hence the need of some restraining force, i.e., of government. But a government is itself only a body of men animated by similar desires and aversions. If unrestrained, the members of a government will merely make their aims supreme and tyrannize over the subjects. The traditional forms of government, democracy, aristocracy, monarchy, do not provide security against this inevitable misuse of power. Self-interest vitiates each form. Nor is such an arrangement as the king, lords, and commons more than a makeshift; any two of these are liable to combine and render the third impotent. The only feasible polity is the "representative system," i.e., government by the people's elected representatives acting as a check on legislative abuse. But, lest elected representatives come to abuse their powers, their election must be for limited terms renewable at the pleasure of the electorate. To further avoid any class-control, it is necessary to have universal suffrage, one man, one vote.

Such, in substance, is Mill's theory of government described by himself as "a chain of inference close and strong to a most unusual degree." It was the authoritative statement of what the Utilitarians were prepared to carry into practical politics. It starts with a conception of human nature and deduces its conclusions with an almost geometrical rigor. As developments showed, Mill's Encyclopedia articles were no mean factor in the train of events which culminated in the Reform Bill of 1832. With its tenets and

influence, however, I am not concerned. The significance of this "deductive" theory of government resides primarily, for the student of John Stuart Mill's early intellectual biography, in the sharp methodological critique which it drew from Macaulay in the pages of the Edinburgh Review. The whole of Macaulay's objections, on this score, may be condensed to one proposition: "We believe it is impossible to deduce the science of government from the principles of human nature." To appreciate the full force of this episode on young Mill, it is well to have some of the "purple" passages from Macaulay's articles directly in mind. One can picture rather easily the effect of the following:

> "Mr. Mill is an Aristotelian of the 15th century born out of due season. We have here an elaborate treatise on government from which it would appear that the author was unaware that any governments actually existed among men. Certain propensities of human nature are assumed; and from these premises the whole science of politics is deduced! We can scarcely persuade ourselves that we are not reading a book written before the time of Bacon and Galileo, in those days when physicians reasoned from the nature of heat to the treatment of fever, when astronomers proved syllogistically that the planets could have no independent motion because the heavens were incorruptible and nature abhorred a vacuum!"[21]

That was by way of a beginning. But, to exhibit further the folly of the "deductive" method, so characteristic of the writings of the philosophical radicals, Macaulay follows by an "attempt to deduce a theory of politics in the mathematical form in which Mr. Mill delights, from premises he has himself furnished." The "deduction," which is little more than a parody, is so constructed that Mill's own premises are made to yield conclusions quite different from the conclusions of his article on Government.

> "Proposition I: No rulers will do anything which may hurt the people. Demonstration: No rulers will do that which produces pain to themselves. But the unfavorable sentiments of the people will give pain to them. Therefore no rulers will do anything which may excite the unfavorable sentiments of the people. But the unfavorable sentiments of the people are excited by everything which hurts them. Therefore no rulers will do anything which may hurt the people. In Mr. Mill's own words, the chain of inference, in this case, is close and strong to a most unusual degree."[22]

This ingenious reductio ad absurdum reminds Macaulay of the general indictment:

> "When men, in treating of things which cannot be circumscribed by precise definitions, adopt this mode of reasoning in politi-

cal matters, when they talk of power, happiness, misery, pain, pleasure, motives, etc., as they talk of lines and numbers, there is no end to the contradictions and absurdities into which they fall. There is no proposition so monstrously untrue in morals or politics that we will not undertake to prove it, by something which shall sound like a logical demonstration, from admitted principles. But we do not see that, by reasoning a priori on such subjects as these, it is possible to advance one single step."[23]

This raised fairly and squarely the whole question of the "logic of the moral sciences." As developments indicated, Mill's System of logic grew out of the attempt to deal adequately with the problem created by this clash between his father and Macaulay on the nature and condition of sound thinking in these fields. That the issue was one of method rather than results, is left clear by some of Macaulay's concluding remarks. For example:

"Our object in writing this article is not so much to attack or defend any particular system of polity, as to expose the vices of a kind of reasoning utterly unfit for moral and political discussion; of a kind of reasoning which may so readily be turned to purposes of falsehood that it ought to receive no quarter even when by accident it may be employed on the side of truth. Our objection to Mr. Mill's essay is fundamental. We believe it is impossible to deduce the science of government from the principles of human nature."[24]

The concluding sentence of that paragraph, by a strange irony, contains the positive outcome of John Stuart Mill's own examination of the question. The upshot of his elaborate enquiry of the principles and methods of scientific procedure, and their application to the phenomena of the moral sciences, is precisely the impossibility of any "science of human nature and society." But considerable analysis and argument lie between this first dogmatic statement by Macaulay and its final formulation by Mill some ten years later.

The moral which Macaulay drew from his rejection of James Mill's "deductive method" is interesting in the light of John Stuart Mill's later observation that "Macaulay's conception of the logic of politics was erroneous." The Edinburgh reviews conclude on what their author doubtless considered a "constructive" note. "How then," he asks, "are we to arrive at valid conclusions on a subject so important to the happiness of mankind?" The answer is:

"By that method which, in every experimental science, has increased our knowledge and our power; by the method of induction; by observing the present state of the world, by studying the history of past ages, by sifting the evidence of facts, by

> combining and contrasting those which are authentic, by generalizing with judgment and diffidence, by perpetually testing, by correcting or abandoning our theory as new facts prove it partially or wholly unsound."[25]

"Macaulay's famous attack on my father's Essay on Government," Mill wrote later in his Autobiography,

> "gave me much to think about. I saw that Macaulay's conception of the logic of politics was erroneous; that he stood for the empirical method of treating political phenomena, against the philosophical; that his notion, even in physical science, might have recognized Kepler but would have excluded Newton and La Place. But I could not help feeling that there was truth in several of his strictures on my father's treatment of the subject; that there was something more fundamentally erroneous in my father's conception of philosophical method, as applicable to politics, than I had hitherto supposed. But I did not at first see clearly what the error might be. At last it flashed upon me all at once in the course of other studies."[26]

These "other studies" were some ideas on logic, which had been suggested in those morning readings at Grote's, and in his earlier readings in the literature of the natural sciences. The logical problem in which Mill's interest centred was induction, "since it is necessary to obtain premises before we can reason from them." Now, induction as Mill conceived it was mainly a process for determining what are the causes of any particular effect. And, in seeking to make clear to himself the way in which effects are traced to their causes in the mathematical branches of physical science he was led to perceive that the method is one of "ascending" by generalization from particulars to the "tendencies" of causes and causal sequences considered singly, and then of reasoning "downwards" from those separate tendencies to their effect when combined. He cites the composition of forces, in dynamics as an example: the "addition" of the separate effect of one force to the separate effect of another, the sum being the effect under investigation. But in the physical sciences which are not mathematical in the sense which, e.g., mechanics and astronomy are mathematical, this method was not pursued. Here the effects of the causes when conjoined are not merely the sum of the effects which the same causes produce when separate. "I then recollected that this was pointed out as one of the distinctions between chemical and mechanical phenomena in that favorite of my boyhood, Thomson's System of Chemistry." What Mill calls here a "mechanical" phenomenon is one which can be accounted for by calculating the effects separately of the various "forces" which produce it; whereas a "chemical" phenomenon is one which is produced by "forces" whose joint product

is not the same as the sum of those forces acting separately. This distinction, between mechanical and chemical phenomena, which, as he says, flashed upon him all at once, made clear what was perplexing him in the logic of politics.

> "I now saw that a science is deductive, if, in the province it deals with, the effects of causes when conjoined are the sum of the effects to which the same causes produce when acting separately. It followed that politics must be a deductive science. Thus both Macaulay and my father were wrong."

Macaulay because he urged in politics the purely experimental method of chemistry; James Mill because, though he adopted a deductive method, took as the type of deduction that method proper to pure geometry which does not require any summing of effects, instead of that method of analysis and summation proper to mechanical phenomena.

At about this time Mill made a trip to Paris, where he met "the younger liberals." On his return to London, the "mental crisis" now over, he began a series of Letters on French Politics in the Examiner. These letters, Professor Minto has stated,[27] "mark his return to hopeful aspiring activity." His enthusiasm had been reawakened and was now taking shape "as an aspiration to supply an unimpeachable method of search for conclusions in moral and social science."

Macaulay's Edinburgh papers appeared in 1828-29. The trip to Paris and the letters to the Examiner occurred in 1829-30. In 1830 a book was published which, there is reason to believe, renewed Mill's interest in the question of method in the social sciences, and the relation of their method to that of the natural sciences. This volume was Herschel's Preliminary discourse on the study of natural philosophy, hailed enthusiastically by Mill and reviewed by him for one of the journals. The extent to which Mill absorbed both the spirit and the ideas of Herschel's Discourse is revealed in many parts of the Logic. The man who remarked that Hume's Treatise plus Herschel's Discourse equals Mill's Logic, spoke to the point. This Discourse opens with three chapters on the general nature and advantages of the study of the physical sciences. This is followed by an examination "of the principles on which physical science relies for its successful prosecution, and the rules by which a systematic examination of nature should be conducted." The connexion between this program and Mill's Logic is too obvious to require notice. One of the "advantages" to which Sir John drew the attention of his readers, as likely to follow from a "study of the physical sciences," is peculiarly interesting in view of the way in which Mill played it up in his review of the Discourse. To quote:

> "The successful results of our experiments and reasonings in natural science tend to impress something of the character of science on the more complicated conduct of our social and moral relations. It is thus that legislation and politics become gradually regarded as experimental sciences; and history, as the archive of experiments gradually accumulating toward the solution of the grand problem--how the advantages of government are to be secured with the least inconvenience to the governed."

When one considers what Sir John conceived to be the "character of science" which was thus to be bestowed on the study of society and its problems, one readily appreciates Mill's enthusiasm. Herschel's description of a scientific conclusion anticipates almost verbally some statements in Mill's Logic: "It is not possible to satisfy ourselves completely that we have arrived at a true statement of any law until from such statement we can show, by strict argument, that the facts observed must follow from it as necessary logical consequences." This was a far cry from the Baconian "scientific method" to which Macaulay had consigned the study of social and political theory. Some sentences from Mill's review reveal the alacrity with which he caught at the implications of Herschel's suggestion.[28]

> "Why is it that the many accept implicitly the decisions of the wisest in physical science? Because in physical science there is all but complete agreement of opinion. And why is there this agreement? Because all accept the same methods of investigation and the same tests of truth. Is it not possible to obtain unanimity as to the method of arriving at conclusions in social and political matters?"

To do so, the inference would seem to be, if completed, would enable us to secure similar agreement of opinion and similar respect for authority. To continue: "The uncertainty hanging over the very elements of moral and social philosophy proves that the means of arriving at truth in these matters are not yet properly understood." It was precisely the search after "the means of arriving at truth in these matters" which led Mill, during the next ten years, to the ideas finally elaborated in his Logic Even at this early stage, the procedure of such an inquiry is clear in his mind: to determine what are the methods of the "successful" sciences, and then observe the extent of their applicability to phenomena in the moral and social field. This is apparent in a concluding sentence of the review: "Whither can mankind turn so advantageously to learn the proper method, as to that branch of knowledge in which, by universal agreement, the greatest number of truths have been ascertained?"

During these years, if we may trust his Autobiography, his mind seems to have been constantly alert for suggestions. He had by this time become thoroughly convinced that "social philosophy" must go deeper than an empirical study of institutions and forms of social control. It was "principles" for which he was grasping; and a method of getting at principles. "The true system of political philosophy," he was certain,[29] "would not supply a set of model institutions, but principles from which institutions suitable to any given circumstances might be deduced." The Logic, despite its great length, was still in his mind a search for methods which might in turn be used in the search for principles. The concluding (sixth) book of the Logic is nothing more than an attempted tryout on Mill's part of his methodological findings in the previous books.

Although Mill was already distinguishing between principles and methods, his immediate concern, as yet, was with the former. Within a year or so he was to make a first attempt at isolating the "method of the sciences"; but, writing at this time to John Sterling, he says, "The only thing which I can usefully do at present is to work out principles which are of use for all times, principles of morals, of government, of law, of education. I am here in my element."[30] He perceived clearly enough, as the same letter makes clear, that the question of method was of paramount importance in any such task.

> "If there is any science I am capable of promoting, it is the science of method. He who can throw most light on the subject of method will do most to forward . . . . the only definite object I ever have. I have put down on paper a great many ideas on logic and shall in time bring forth a treatise."

Some time this year, or early in the next, Mill wrote an essay on the definition and method of economics. The full title is significant: "On the definition of political economy and on the method of investigation proper to it." This paper (published 1836 and republished 1844 in Essays on some unsettled questions) shows very clearly that Mill's interest in logic was still subordinate to his interest in the "moral sciences." It was only gradually that the quest for method came to dominate his interests and control his reading. And then only temporarily, as his subsequent writings on economics, government, ethics, socialism, etc., seem to indicate. This Essay anticipates so clearly the core of the Logic and of the attempt to indicate the manner in which the method of the natural sciences may be applied in the moral sciences, that it seems not irrelevant, at this point, to reproduce in condensed form some of its conclusions. What Mill would call "the argument" is this:

(1) We must begin by distinguishing sharply between a science and an art. Science differs from art as the indicative mood differs from the imperative. The one deals in facts; the other in precepts. The one is a body of truths; the other a body of rules or directions. The one says, Such is or is not the case; the other, Do this, Avoid that. The one refers to phenomena and endeavors to detect their laws; the other refers to ends, and endeavors to discover the appropriate means. If, therefore, political economy is a science, it is not a body of rules for controlling or increasing national wealth. Nor can it be defined as "the laws of the production and distribution of wealth"; for such a definition is too broad. Many of the laws of the physical sciences operate in the production and consumption of wealth. The problem is to define the field of political economy in such a way that it will not include physical science. To do this we must first distinguish between the physical sciences as a group and the moral sciences as a group. The former seek to discover the laws of matter and of all phenomena in so far as they depend on the laws of mind. This enables us to define political economy, which is one of the moral sciences, as the enquiry into the production and distribution of wealth in so far as these processes depend on any law or laws of human nature. On any other view it is not a science at all, but an art; or it is several sciences which we are failing to distinguish. This enables us to mark off political economy from any of the physical sciences. It remains to determine the criterion by which we may mark it off from the other moral sciences. The moral sciences as a group may be defined as the study of human nature as it is in the individual, and as it is in society. Within this grouping we may classify those moral sciences which study human nature in society, on the basis of the particular laws of human nature controlling the phenomena which constitute their field. One such group is controlled by the law of human nature which operates in man when he exerts himself to produce wealth; the law, namely, that an individual will always prefer a greater gain to a less provided there is not a disproportionate expenditure involved. The totality of social phenomena which depend on the operation of this law of human nature constitute the subject matter of political economy. Conversely, political economy may now be defined as the study of the laws of those social phenomena which depend on the operation of this particular law of human nature. This, however, is never the sole law of human nature. Hence the laws of political economy, which presuppose it alone, and would be completely valid only if this

were the sole law of human nature, are hypothetical or abstract in their nature. They are based on an abstraction, and must, in concrete prediction, be supplemented by calculations from laws based on other laws of human nature.

(2) If this is the proper definition of political economy, what is the proper method for prosecuting such enquiries? We may seek to detect laws of phenomena in either of two ways. We may (as Macaulay would have us) argue from particular facts to general conclusions. Or we may (like Ricardo and Malthus) argue from an hypothesis suggested by particular facts to particular conclusions and then, by comparing our particular conclusions with more particular facts, verify the hypothesis suggested by the initial particular facts. The first method is induction per enumerationem simplicem. The second is a combination of induction, hypothesis, ratiocination, and verification. The first is a posteriori; the second a priori. The first never gets beyond a tentative generalization from specific cases. The second, to the extent to which it is possible, gets to verified laws. The first, in fields where controlled experiment is impossible, is useless. The second, which involves what we may call a thought-experiment, on hypothesis not on facts, is alone available. For these reasons what we have described as the "a priori method" must be proper to political economy. It argues from assumptions, hypotheses, initial definitions--call them what you will--to conclusions which must be verified by reference to particular facts. Its assumption, hypothesis, initial abstraction, is that man invariably acts so as to obtain pleasure and avoid pain at the minimum cost of effort. It reasons from this hypothesis to particular conclusions. Its accuracy is determined by the degree to which such a priori calculation corresponds to the particular facts of any case. It may be that this hypothesis is not found prefixed to treatises on economics, as, e.g., the definition of a straight line is prefixed to a treatise on geometry. This is merely a matter for regret; assumptions should be stated. If this is the method of political economy, its conclusions, we need not repeat, are only hypothetically valid. In this, it resembles geometry: the conclusions of a geometrical calculation are not true of the lines, angles, and figures which we actually experience. But no one contends that we should, for this reason, cease geometrizing and rest satisfied with "practice" and "concrete" experience. No mathematician will abandon his science because his hypothetical lines do not correspond to actual lines. As little should the economist abandon his science because his "economic man" is a

> necessary methodological fiction. No mathematician claims his conclusions to hold for concrete facts nor should the economist. Both must modify their conclusions to the extent to which they are based on abstractions. It is in this connexion that the economist must make copious use of empirical generalizations where these are available, or of mere particular observed facts where such generalizations are not available. This method, which we have described as proper to political economy, is also the method of each of the other moral sciences. Each of the social sciences operates with hypotheses grounded in the individual nature of man. Their conclusions are, in all cases, only hypothetically valid, and require to be supplemented by empirically observed facts.

I have made this rather lengthy condensation of Mill's forty-four pages on the definition and method of economics because, it seems to me, the Essay reveals very clearly the way in which his thoughts were shaping. During the succeeding ten years he reworked the problem of scientific method on a considerably larger scale, under the impetus of writings by Comte and Whewell which, at the time of the Essay, had not yet been published. It would be difficult, although perhaps possible, to recreate step by step the path of his progress during those ten years from 1831 to 1841 when the first draught of the Logic was completed. Such a task, however, transcends the resources at hand. There are unpublished letters and uncollected articles and reviews which it would be necessary to possess. But, knowing at least this much of his problem, his ideas, and his intentions in 1830-31, we may pass to a consideration of the more elaborate analysis presented in the Logic.

CHAPTER II

THE LOGIC OF SCIENCE

1. Scientific Concepts

In 1831 Mill wrote his essay on the definition and method of economics. By 1840 he had completed the first draft of his Logic. This latter, his first book, grew directly out of his efforts to deal with the issues raised by Macaulay. Generalized, the question was this, Can there be a "social" science? Can the data and problems presented by human nature and society be "scientifically" dealt with? In Mill's terms, What is the "logic" of these moral sciences? In more recent terms, What is the "method" of the social sciences?

From this perspective the Logic may be said to consist of four parts: (1) A description of "nature," i.e., the totality of events and processes which constitute the field of scientific investigation. (2) An enumeration of two principal methods (the inductive and the deductive) of investigating nature so described. (3) An appendix, so to speak, in which the particular class of events and processes termed "social" are described in more detail and the value of the two methods estimated for this field. (4) An examination of the relevance of syllogistic logic to the whole question of investigating the events and processes which constitute "nature." So regarded, the Logic is an attempt to show three things: (1) the aim of any scientific investigation, (2) the methods available, (3) the identity of aim and method in the "natural" or "physical" sciences and in the proposed "moral" sciences. The thoroughness with which Mill set forth what he conceived to be the aim and method of all scientific investigation tends to obscure the initial purpose of the Logic, namely, to show the extent to which "scientific method" means the same in physics as in economics, in chemistry as in sociology.[1]

The rest of this chapter will be concerned with Mill's general account of the "order of nature" which all sciences investigate.

> "The order of nature presents a vast mass of causes followed by a vast mass of effects. The object of (scientific) inquiry is to ascertain what causes are connected with what effects and what effects are connected with what causes."

This statement[2] holds, so far as the Logic is concerned, for the "nature" investigated by any (or all) of the ologies. The further analysis of this conception of a "vast mass of causes followed by a vast mass of effects" provides Mill with a closer description of what a scientific investigation investigates.

(1) That "natural order," which is the object of all scientific inquiry, presents the appearance of vast and minute patterns of repetition. Its regularity comprises particular regularities. There is not one "uniformity of nature"; rather, "nature" consists of many uniformities: dogs reproduce dogs, spring follows winter, the earth repeats its journey around the sun, rents rise with population, tyranny breeds rebellion, and so on indefinitely.

(2) These uniformities are of two classes: (a) uniformities of co-existence: whenever A occurs, B occurs also; (b) uniformities of succession: A is always followed by B. These two kinds of uniformities may be detected in the fields to be investigated by the moral sciences no less than those of the physical sciences. While it is true that April showers are followed by May flowers, it seems no less true that an excess of law-making is followed by an excess of law-breaking. The uniformities of succession, because they provide the basis for the notion of cause and (ultimately) of control, are more peculiarly the object of scientific investigation.

(3) In the field of every science, natural or moral, there are detected uniformities which provide the content for the "laws" which each science aims to formulate. A law, to use Mill's nominalistic definition, is any proposition expressing a uniformity in the natural order. Any particular regularity within the "vast mass of causes followed by a vast mass of effects" may be conceptually separated and expressed as a law. Laws, in this sense, are not peculiar to the physical sciences, since uniformities are not peculiar to physical phenomena. That the square of the periodic time of any planet is proportional to the cube of its mean distance from the sun is a detected uniformity which may be expressed as a law. But the uniformity, e.g., that in a freely competitive market prices tend to the level of production costs, may also be expressed as a law.

(4) In the field of every science, natural or moral, there are uniformities which can be "resolved into," or shown to be particular cases of, more general uniformities. The uniformities expressed in Kepler's three laws of planetary motion were "resolved" by Newton into the more general uniformity that every particle of matter attracts every other particle of matter inversely as the square of their distances and directly as their masses. But, similarly, the uniformities expressed in Ricardo's "economic laws" may be exhibited as particular cases of the more general uniformity

that supply varies with demand. Or, to cite another case, the uniformity with which I think of Socrates whenever I hear the word "Athens," and the uniformity with which you think of soap whenever you hear the word "suds," may be exhibited as cases of the more general uniformity expressed in the law of associative recall.

Mill proposed to reserve the term "law of nature" or "ultimate law" for the formulations of those uniformities which seem to be not further reducible. The law of gravitation, for him, was such an ultimate "law of nature." So also were the laws of association. For propositions expressing uniformities which are further reducible he proposed the term "derivative law." Every science would thus have its ultimate and derivative laws. The value of this sliding-scale distinction between ultimate and derivative is not altogether obvious, beyond the fact that it enables Mill to define the goal of any particular science.

(5) In the field of physical and social-moral phenomena there are uniformities which are expressible in quantitative terms. The rate of acceleration of a falling body, the areas marked out by a line joining the sun and any of its planets, the proportions of oxygen and hydrogen which combine to produce water, are examples of quantitatively measurable uniformities among physical phenomena. The ratio of increase or decrease in intensity of stimuli to change in sensation, the ratio of marriages to divorces for specified areas over specified times, the trends and correlations revealed by various analyses of vital statistics, are examples from among social-moral phenomena. There is nothing peculiar to social-moral phenomena which precludes the possibility of a mathematical expression of some of the uniformities they exhibit.

(6) There is one uniformity common to all sciences, namely, that in each of their fields certain phenomena are invariably and unconditionally followed by certain other phenomena. This all-pervading uniformity is expressed by Mill as the law of causation. A cause is any aggregation of phenomena which is followed invariably and unconditionally by some other aggregation of phenomena which we term its effect. The law of causation expresses that most general uniformity that any event A is followed invariably and unconditionally by the event B. The application of a lighted match to dry gun-powder is followed thus by an explosion. Wars of sufficient magnitude are followed thus by economic depression. A period of puritanism in morality is followed thus by a period of comparative laxity. The sight of food to a hungry man is followed thus by the functioning of the salivary glands. This basic kind of uniformity is present in the fields of all the sciences.

The concept of nature which is invoked by the analysis thus far is over-simple and abstract. The "vast mass of causes followed uniformly by the vast mass of effects," into which the scientific investigator gradually picks his way, relating cause to effect and detecting specific strands of uniformity, is by no means so easy to unravel as the argument thus far might suggest. This fact, which the least investigation of nature is usually sufficient to reveal, is implied in some further terms introduced by Mill. The point of importance is that the "laws" of nature do not operate in isolation. The uniformities expressed by any natural law are abstracted from a context of other uniformities. The interaction of these causal sequences complicates the conception of nature at once.

(7) In the field of the physical and moral sciences there are what Mill calls "counter-acting" causes. The uniformity with which any event (or set of events) is followed by what we call its "effect," is often disturbed, or counteracted, or "truncated," by another strand of events. The uniformity, e.g., with which a declaration of peace is followed by a slump in certain lines of production may be counteracted by the occurrence of another event which would stimulate production anew. The uniformity with which an object moves to the right when struck on the left side may be counteracted or disturbed by a blow on the right side. The fact of possible "counteracting causes" complicates the picture considerably. They make that prediction at which scientific knowledge aims, in the physical and in the moral sciences, problematic, to say the least. Mill's Logic turns, to a considerable extent, on the difficulties created by the interaction of these causal series. The initial simplicity of the conception of a "vast mass of causes followed by a vast mass of effects" vanishes still more completely as Mill's analysis proceeds.

(8) In the field of any science, phenomena are usually, if not always, produced by the joint action of two or more causes. This fact, that any effect is usually produced by the concurrence of several causes, Mill designates by the term "conjunction of causes." This conception is identical with the conception of counteracting causes, with merely a difference in where the emphasis is placed. From the fact that effects are produced by a conjunction of causes, it follows that the problem of investigating any phenomenon is to determine, not its cause, but its causes. "The great problem is to discover the particular conjunction of causes."

Causes may conjoin in two ways. (1) Their joint effect may be what it would have been had they operated successively instead of conjointly. Where such is the case, Mill suggests the

term "composition of causes," and, as a corollary, "compound effect." Any phenomenon, produced by the joint action of two causes, which would have resulted from their successive action is a compound effect resulting from a composition of causes. This conception had been anticipated to some extent in the essay on the definition and method of political economy, in the term "mechanical" effect. If the effect of a word followed by a blow is the same as the effect of a word accompanied by a blow, then that effect would be "compound." The causes which might move a stone ten feet ahead and ten feet to the right would, in the end, produce the same effect acting concurrently or successively. (2) Causes may conjoin in a second manner. The effect which follows from their joint action may be different from what follows their successive action. Where such is the case, Mill suggests the term "combination of causes," and, as a corollary, "heteropathic effect." The examples which Mill cites are drawn principally from chemistry. "The chemical combination of two substances produces a third substance with properties different from either of the two substances taken separately, or considered together. No trace of the properties of hydrogen or oxygen are observable in their compound, water."

Now, the fact that causes may conjoin in these two ways to produce either compound or heteropathic effects is of primary importance for the general enquiry in which Mill is engaged. The two principal methods of reasoning in scientific procedure are due to the presence in nature of complex effects, i.e., events produced by the composition or compounding of two or more causes. Prediction of compound effects is simpler than prediction of heteropathic effects. The causes of a compound effect may be isolated, their separate uniformities investigated, and their joint product anticipated with some degree of certainty and exactitude. This fact makes for what Mill calls an abstract or a priori science: "abstract" because the law of the concurring uniformities are studied in isolation; "a priori" because their joint product can be calculated in advance. His unquestioned conviction that moral and social phenomena are of this compound nature is the basis for his belief that such phenomena can be scientifically investigated. His objection to Macaulay's experimentalism rests on his belief that Macaulay misinterpreted social phenomena at precisely this point. If social phenomena are heteropathic, to use Mill's phrase, then his chapters on the logic of the social sciences rest on a fallacy; and Macaulay's word remains final.

The following quotation gives in Mill's own words the distinctions to which the preceding paragraphs have referred:

"A concurrence of two or more causes, not separately producing each its own effect but modifying the effects of one another, takes place in two ways. In the one, exemplified by the joint operation of different forces in mechanics, the separate effects of all the causes continue to be reproduced but disappear in one total. In the other, illustrated by the case of chemical action, the separate effects cease entirely and are succeeded by phenomena altogether different and governed by different laws."

(9) In the fields of both physical and social sciences there are phenomena which may have what Mill calls a "plurality of causes." The conception connoted by that phrase is perhaps the product of some very loose thinking, but it is needed to round out the picture. By "plurality of causes" Mill means that the effect in question would have followed equally from any of several causes or sets of causes. Heat, for instance, may be caused by the sun's rays, by a fire, or by friction. Death may be caused by starvation, by drowning, by a bullet, or by poison. Economic depression may be caused by war, by labor unrest, by excessive tariffs or by exhaustion of raw materials. And so on. The point to be emphasized is simply that a plurality of causes is not peculiar to any particular class of phenomena: it creates a methodological problem in the natural as well as the moral sciences.

(10) In the fields investigated by the natural and social sciences there is a phenomenon which Mill describes as "progressive effect." His definition is not as helpful as might be: "A progressive effect is a complex effect arising from the continued operation of one cause by the addition of an effect to itself." The normal increase of population among rabbits, for instance, is a case of progressive effect. One pair produce, normally, more than one pair. Each pair produces, normally, more than one pair. The rate of reproduction is thus more geometrical than arithmetical. The effect is cumulative, or to use Mill's term, progressive. The spread of gossip is usually a progressive effect. The fall of heavy bodies, sixteen feet in the first second, forty-eight feet in the second, and so on, is a progressive effect. Mill describes this phenomenon elsewhere as the continued action of a cause whose effects themselves are added to it as further causes, the cumulative or progressive result amounting to what a similar number of successively introduced similar causes would have produced. The conception of "progressive effect" animates most of the so-called "laws of progress" which were written about by social philosophers from Condorcet to Spencer: each advance brings with it the possibilities of still greater advance.

(11) Both the natural and the social sciences include within their fields of investigation instances of what Mill calls "chance" conjunctions among phenomena. Conjunctions of phenomena are said to happen by chance when the causal sequences leading to those phenomena are not causally related. It is genuinely possible, Mill seems to argue, that the causal sequence which brings an airplane into the path of a falling meteor is in no way causally connected with the causal sequence which involves the presence of the meteor at that particular point in space and time.

(12) Both natural and social uniformities give rise to what Mill calls "empirical laws." This term refers to the fact that observation may reveal certain uniformities without disclosing their connexion with other known uniformities. Empirical laws are derivative laws which have not yet been derived. The periodical return of eclipses was expressible only as an empirical law, until it had been accounted for in terms of the general laws of planetary motion The uniformity called "business cycles," or "trade crises," is (I believe) expressible only as an empirical law. The rise and fall of rents, until Ricardo pointed out their connexion with density of population, could have been expressed only in empirical laws. All "statistical trends," so far as I understand that term, express only empirical laws, i.e., uniformities not yet shown to be causally (or functionally) connected with other more adequately understood uniformities.

These and similar conceptions (uniformity; co-existence and succession; law, ultimate and derivative and empirical; causation; counteracting causes; conjunction of causes and complex effects; plurality of causes; progressive effects; chance conjunctions) are used by Mill to describe in general terms that "nature" which the several sciences investigate. The categories apply equally to "physical" nature and to "moral and social" nature. Both physical and social phenomena exhibit uniformities. These uniformities may be of coexistence or succession. They are expressed as laws, in some cases, mathematically expressed. These laws may be ultimate or derivative or merely empirical. They are "causally connected" uniformities. They exhibit counteracting causes, progressive effects, and chance conjunctions. If physical and social-moral phenomena are thus basically similar, why are they not equally open to scientific investigation? What "goes on," so to speak, in a scientific investigation of physical phenomena which may not, at least within limits, "go on" in an investigation of social-moral phenomena? What does investigation of nature reveal or aim to reveal in the one field that it may not reveal or aim to reveal in the other? A physicist or a chemist picks his way gradually into "a vast mass of causes followed by a vast mass of effects." Why may not a psychologist or a sociologist

aim to do the same? The natural scientist is confronted with uniformities, conjunction and plurality of causes, complex and progressive effects, and chance conjunctions. Is not the social scientist? The one seeks to formulate empirical,derivative and ultimate laws. Is there anything in the nature of social-moral phenomena which precludes such a possibility?

This, it seems to me, is the first part of Mill's answer to Macaulay and all others who urge the impossibility of any moral and social science: An examination of what a scientific investigation investigates, reveals nothing which might not be looked for as well in social-moral phenomena as in physical phenomena. The second part of the argument, essentially analogous to the first, is an exposition of the two principal methods for investigating the phenomena of nature, described above. The third is the attempt to show that precisely these methods, which have yielded results in the physical sciences, may be expected to yield similar, although less definite, results in the social-moral sciences.

2. Scientific Methods

The problem of "scientific method," as it appears in Mill's Logic, is best understood in terms of the concepts set forth in the preceding pages. He conceived nature, it will be remembered, as a vast mass of causes followed by a vast mass of effects. The object of scientific inquiry is to determine what particular causes are connected with what particular effects, and vice versa. A "scientific method" is a way of doing just that; a procedure to be followed in picking one's way into a highly complex system of vast and minute uniformities, where particular uniformities are instances of more general uniformities, where causes counteract and conjoin, where effects are compound or heteropathic or progressive, where chance conjunctions occur between "independent" causal sequences, and so on. Mill has described the task which confronts scientific investigation of nature:

> "The order of nature, as perceived at first glance, presents at every instance a chaos followed by another chaos. We must decompose each chaos into single facts. We must learn to see in the chaotic antecedent a multitude of distinct antecedents; in the chaotic consequent, a multitude of distinct consequents. The question is then how to resolve this complex uniformity into the simpler uniformities which compose it, and assign to each portion of the vast antecedent that portion of the vast consequent which is connected with it."[3]

There is one "preliminary consideration" that animates Mill's chapters on this problem which may be profitably noted at this point. It is this: Any investigation of nature, any attempt to detect uniformities, must be "inductive"; that is, must proceed by particular experiences of the uniformity. At no time is a uniformity laid bare for our inspection, as a uniformity. We are limited to recurring instances of the uniformity. The "law," in which it is finally expressed is a generalization made by us on the basis of our experience of particular instances. Mill does not mean by this that a law is valid only for the cases from which it is generalized. The uniformity is prior to our discovery and formulation of it. This may involve some bad philosophy. Bradley certainly thought it did.[4] But the point is that Mill's chapters on method are controlled by the conception of nature as a system of vast and minute regularities. The problem is how to detect these regularities and express them as laws. And the nub of the problem resides in the fact that we are limited in our experiences to instances from which we must infer the uniformity. These reflections indicate more concretely the nature of the problem of scientific method. Nature is enormously complex, though in ways which may be distinguished and dealt with. Our experience of her regularities is confined to instances. How, in the light of these complexities in nature and this limitation in ourselves, can we "contrive to distinguish among a mass of co-existent phenomena, the particular effects due to a given cause, or the particular cause of a given effect?"

These complexities and limitations are not peculiar to any field of nature. They confront the investigation of physical phenomena. They confront, in a more aggravated form perhaps, the investigator of social-moral phenomena. Methods for dealing with them in one field should work, mutatis mutandis, in the other. With this idea never far from his mind, Mill comes to grips with the problem. There are three methods or "approaches" to the task of detecting strands of regularity in nature: (observation, experiment, ratiocination). Which method we use is determined to a large extent by the nature of the investigation and the extent of our knowledge of the subject.

(1) The conditions may be such as to reduce our effects to simple observation. The phenomena may be so remote, inaccessible, or complicated that we are at no stage more than mere spectators, able to record our observations but not able to control or retard or vary the process under investigation. This is scientific inquiry at its lowest level. It yields only "empirical" laws. To quote: "Observation without experiment can ascertain

sequences and co-existences, but cannot prove causation." Even so, how may such merely observational findings be manipulated in order to extract from them the maximum of probability? Mill's answer, which holds for the same problem created by the second method, may be deferred to a later paragraph.

(2) The phenomena may lend themselves to experimental control. An investigator may be able to isolate the process from its usual context, repeat, retard, or otherwise vary it. Where phenomena lend themselves to such controlled examination, the possibility of detecting uniformities is considerably increased. Even so, to repeat, when may one conclude from experimental findings, that a given antecedent and consequent are causally, i.e., invariably and unconditionally, connected? Mill proposes five tests for "singling out" from among the antecedents or consequents of a phenomena those with which it is really connected. They are these:

(a) If, in two or more instances of a phenomenon, its antecedents (or consequents) have only one factor in common, then that factor is the cause (or effect) of the phenomenon.

(b) If the antecedents (or consequents) of an instance in which a phenomenon occurs differ in one factor only from the antecedents (or consequents) of an instance in which the phenomenon does not occur, that factor occurring only when the phenomenon occurs, then it is the cause (or effect) of the phenomenon.

(c) If the antecedents (or consequents) of two or more instances in which a phenomenon occurs have only one factor in common, while the antecedents (or consequents) of two or more instances in which the phenomenon does not occur, have nothing in common save the absence of that factor, then that factor is the cause (or effect) of the phenomenon.

(d) Subduct from the antecedents (or consequents) of a phenomenon such as are known (by a previous induction) to be the cause (or effect) of a part of the phenomena, and the rest of the antecedents (or consequents) are the cause (or effect) of the rest of the phenomenon.

(e) A phenomenon which varies in any manner when another phenomenon varies in some specific manner, is either a cause or an effect of that phenomenon, or is connected with it through some fact of causation.

Mill speaks of these five propositions as the "canons" of experimental investigation. They are not methods of experiment. They have, directly, nothing to do with experimental or laboratory technique. They are not ways of obtaining data. They are rules for testing the significance for causal explanation of the findings of observation and experiment; and, as such, their utility is limited to investigations which are amenable to observational and

experimental procedure; to what Mill calls the a posteriori sciences. They are, as Mill sees them, the indispensable organon of such sciences.

These five canons have been subjected to considerable criticism. Bradley's celebrated chapter is perhaps the locus classicus for such philosophical merriment.[5] I do not propose to defend or criticize them here. They form an integral part of Mill's general thesis that an examination of scientific method will show the extent to which social-moral phenomena may be scientifically investigated. They carry their meaning on their face to a sufficient extent that any detailed exposition seems superfluous. The point to be emphasized is that they supply, in Mill's estimation, a method for testing observational and experimental findings, in any field--physical, social, psychological, economic--where such methods are adequate or possible.

There are some fields, however, in which observation is inadequate and experiment impossible. Here investigation cannot be a posteriori, but a priori. Here the five canons do not come into play. It was the fact of such phenomena in physical nature and of genuine scientific progress in dealing with them, that encouraged Mill to entertain the hope of their scientific treatment in social-moral fields. In setting limits to the a posteriori methods, by way of transition to an analysis of the a priori method, Mill remarks:

> "In the preceding exposition of the canons of observation and experiment, it has been necessary to represent every effect as connected with a single cause and as incapable of being mixed with any other co-existent effect; to regard a-b-c-d-e, the aggregate of the phenomena, as consisting of dissimilar facts a-b-c-d-e, for each of which one and only one cause needs be sought--the difficulty being only that of singling out this one cause from the multitude of antecedent circumstances."

The rôle of the canons, under such conditions, is obvious enough. If such were the case it would be a comparatively easy task to detect the uniformities of nature.

But such a simplified conception of nature is inadequate on two counts. (1) It does not allow for the possibility of what Mill calls a "plurality of causes": the same phenomenon is not always produced by the same cause. (2) It ignores the fact of the composition and compounding of causes, and the correlative facts of compound and heteropathic effects. Mill devotes an entire chapter to the difficulty of a posteriori investigation of a possible plurality of causes, and to the impossibility of a posteriori investigation of complex effects. The details of this examination

need not be repeated here. The point to be kept in mind is that plurality of causes and complex effects, whether they occur in the field of the physical or the social-moral sciences, are not amenable to the a posteriori methods of investigation. Phenomena in which they occur constitute the field of the a priori sciences. It was the undeniable fact of such phenomena, and of the success with which they were being investigated, that convinced Mill of the possibility of a similar success in the proposed "moral sciences." The one great science of Mill's day (astronomy) was a priori in his sense of the term: simple observation was inadequate and controlled experiment was impossible. Yet astronomy was more firmly established than any of the a posteriori group. The nerve of his Logic, considered as a prolegomena to the moral sciences, resides in his insistence that all sciences are not a posteriori, that the Baconian tradition of simple observation and controlled experiment to which Macaulay had referred Mill senior, was simply not the last word in science, that genuine discovery is not limited to fields where the canons are applicable. To quote: "I saw that Macaulay's conception was erroneous; that he stood up for the empirical mode of treating phenomena; that even in physical science his notion might have recognized Kepler but would have excluded Newton and La Place."[6]

(3) The third method for detecting uniformities in nature, the method of the a priori sciences, the method required by the presence in nature of conjoint causes and complex effects, the method by which Ricardo was bringing order into economics and by which Mill hoped to see the social-moral sciences proceed to their place in the sun is called by Mill the deductive method. This "method" consists of three steps: (1) inductive formulation, checked by the five canons, of the separate laws which are believed to combine to produce the inaccessible or complex effect under investigation; (2) ratiocination from these inductions to their joint product, i.e., calculation a priori of the effects which a given combination of these inductively ascertained simple laws would produce; (3) verification, by investigation of a specific complex effect, of the results obtained by a priori ratiocination.

The deductive method is directed primarily at what Mill calls complex effects. The essence of the method lies in the attempt to state what combining laws would produce the given complex effect, and then verify this calculation by analysis of the given effect. The "law" of the combining uniformities must be known before any "ratiocination" can be made. This knowledge can only be obtained a posteriori, inductively: deduction, in this sense, rests on previous induction, but it seeks to go beyond them

and detect complex uniformities which are not open to observational or experimental investigation. Some phenomenon A is the joint product of two or more causes X-Y-Z. This cannot be known at first. But if these or other causes have, on previous occasions, been studied separately and their law formulated, then by calculating what they or others would produce if conjoined; and by comparing the results of such calculation with the complex effect given in experience it should be possible to conclude whether they are combining in this case. If, to repeat, separate uniformities can be detected, then, assuming their joint product to be what Mill calls "compound" and not "heteropathic," the question is one of calculating their joint produce. These a priori reckonings must be carefully and constantly checked by reference to the situation in hand. The degree of correspondence between the conclusions reached by ratiocination and the complex effect being investigated, is the degree of truth yielded by this deductive procedure.

To quote: "The deductive method considers separately the causes which enter into a complex effect, computes that effect apriori from the produce of the effects of the different causes, and verifies by reference to the given complex effect." This is the "grand agency" for detecting the law of complex effects. It is interesting to note that Mill's first illustration is drawn from the field of the moral sciences, although he had himself learned its use from a study of astronomy. To quote:

> "Thus, if the subject be social phenomena, the premises of the deductive method must be the laws of the causes which determine that class of phenomena; and those causes are human actions together with the circumstances under which mankind are placed. The deductive method applied to social phenomena must begin by investigating the laws of human action and those properties of things by which human action in society are determined. Some of these formulations will be obtained by observation and experiment, others by deduction."

Jevons, acknowledging Mill's priority, describes the deductive method very neatly in his Principles of Science, published just thirty-one years after the System of Logic:

> "Being in possession of certain particular facts, we imagine some more general law or cause; and, deducing the particular results of that supposed law, we observe whether they agree with the facts in question. There are thus but three steps: (1) framing some hypothesis as to the character of the general law; (2) deducing consequences from that law; (3) observing whether the consequences agree with the facts under consideration."

Mill's views concerning the deductive method probably form the most original and valuable part of his treatise.

The deductive method presents two forms according to the mode of its application. When the law is obtained by deduction first and then verified by reference to the given facts, Mill speaks of it as the direct deductive method. When the law is formulated more or less conjecturally from direct experience and afterwards verified by exhibiting it as deducible from more general or better known laws, Mill speaks of it as the inverse deductive method. In the direct method the results of ratiocination are compared with experience. In the inverse method experience is compared with the results of ratiocination. Mill could have cited Ricardian economics as proceeding by the direct method,[7] and Comte's historical sociology by the inverse method.

The epitome of Mill's description of scientific method might be extended to include his chapters on the explanation of laws, on hypotheses, on the elimination of chance, on the calculation of probability, on the use of analogy, on approximate generalization, and so on. As my concern here is not primarily with Mill's conception of scientific method, but with his conviction that if that method is grasped in its essentials it will be seen to apply as well to social-moral phenomena as to physical phenomena, these other chapters may be passed over with the remark that they emphasize the same point; whatever rôle hypotheses, calculation of probability, analogy and other similar conceptions play in the "natural" sciences, they should be expected to play in the "moral" sciences. That is the significance of the System of Logic in the history of social thought. It is a kind of organon for what Halevy has aptly described as "Newtonism in the moral sciences." In a chapter added to one of the later editions, Mill reminds his reader that the doctrine that moral and social phenomena are subject to general laws which investigation may detect was "at the time of the publication of this treatise, almost a novelty"; and that "the prevailing habits of thought were the very reverse of a preparation for it."

As Book Six reveals, Mill believed that in the deductive method he had found the answer to Macaulay's criticisms of Utilitarians' conception of a science of human nature and society. To the deductive method of preliminary induction, ratiocination and verification, "the human mind is indebted for its most conspicuous triumphs in the investigation of nature. To it we owe all the theories by which vast and complicated phenomena, not amenable to observational or experimental investigation, are embraced under a few simple laws which could never have been detected by their

direct study." This was the method of Newtonian astronomy, Ricardian economics, and Comtean sociology.

Having formulated "the principles of evidence and the methods of scientific investigation," there remained only to indicate the manner in which and the extent to which these principles and methods apply to the phenomena of human nature and society. His own words are to the point:

> "It remains to examine which of these methods are more especially suited to the various branches of moral enquiry; under what difficulties they are there employed; how far the unsatisfactory state of those enquiries is due to a wrong choice of methods; and what degree of ultimate success may be hoped for a better choice and a more careful use of the appropriate method. In other words: whether moral sciences do or can exist; to what degree of perfection they are susceptible; and by what selection or adaptation of the methods brought to view in this book that perfection is attainable."[8]

That quotation from Mill may serve as the plan of the next section of this paper. I propose to discuss his chapters on the logic of the moral sciences under three general heads: (1) The articulation of the moral sciences--indicating briefly what particular sciences were supposed to be denoted by that term, what fields each of them was supposed to cover, and how they were related one to another, their "Zwischengliederungen"; (2) The methods of the moral sciences--indicating which of the two general procedures, a posteriori or a priori, was required, in Mill's mind, by the data with which it dealt; (3) The limits of the moral sciences--indicating the factors which, to Mill's way of thinking, set a limit to the formulation of law in these fields; and (4) The problems of freedom and purpose--indicating the manner in which the hoary questions of free will and the selection of ends are raised once more by the conception of a science of social control.

CHAPTER III

THE LOGIC OF THE MORAL SCIENCES

1. The Articulation of the Moral Sciences

Mill reminds the reader that he does not propose to deal at any great length with the data and problems of the moral sciences; only with their "logic," i.e., their articulation, method and limitations. "Doubtless," he remarks, "the most effectual mode of showing how the moral sciences may be constructed, would be to construct them, a task which I am not about to undertake."[1] He proposes rather, to indicate the bearing of his analysis of scientific concepts and methods on the several moral sciences. "As the example of Bacon demonstrates, it is sometimes possible and useful to point out the way without being prepared to adventure far into it." Moreover, whatever he can do for the logic of the moral sciences he has already accomplished since "the methods of the moral sciences must have been already described if I have succeeded in enumerating the methods of science in general."

Mill nowhere lists in detail just which sciences he regards as "moral." From references scattered through Book Six, however, it would seem that these "sciences" constituted a kind of hierarchy which might be represented thus:

(1) The science of human nature
- psychology
- ethology

(2) The science of society
- general sociology
  - social statics
  - social dynamics
- particular social sciences
  - political economy
  - political ethology

In general, the science of human nature as Mill conceived it would deal with the thoughts, feelings, desires and actions of human beings, seeking to detect the uniformities which these phenomena exhibit. It would have attained its ideal, he says, if it

"enabled us to foretell how an individual would think, feel, and act throughout life with the same certainty with which astronomy enables us to predict the places and occultations of the heavenly bodies."[2] Given the motives which are at any time present to an individual's mind, given a knowledge of his character, the science of human nature would enable us to infer the manner in which he will act. "If we knew the person thoroughly, knew also the inducements which were acting upon him, we could foretell his conduct with as much certainty as we can predict any physical event." That, for Mill, is the general hope which a science of human nature holds for its devotees.

The general "science of human nature" comprised at least two, and perhaps more subsidiary sciences, namely, psychology and ethology. The former is the more basic. For Mill, psychology was the attempt to detect the uniformities, ultimate and derivative, exhibited by the come and go of our ideas or (to borrow his term) our "mental states." The formulation of these uniformities he calls the "laws of mind." It is necessary to an understanding of the "hierarchical" order of the moral sciences that one grasp Mill's point that psychology is basic to the others. He is going to argue for a science (ethology) which shall investigate the laws of character formation, and for a science (sociology) which shall investigate the laws of human action in society. Psychology is basic to these. His point is, I take it, that these more complex phenomena (character and group action) are analyzable ultimately into some individual's "mental states." The term "character" is only a collective name for the particular assortment of "mental states" which tend to recur in any individual mind. Such a term (not found in the Logic) as "group mind" would mean, for Mill, only "many individual minds." In this way the laws of the individual mind (the subject-matter of psychology) hold, Mill would argue, for the phenomena which constitute the subject matter of the other moral sciences in much the same way as the law of gravitation holds for terrestrial mechanics and astronomy.

Mill mentions four or five "laws" in the field of psychology. At the risk of a possible tedium, these must be noted in order to give point to his remarks on the question of method in psychology. (1) The first law of the mind is this: when any actual state has once been excited, by no matter what cause, a mental state resembling it but inferior to it in intensity, may be reproduced without the presence of that which originally caused it. This uniformity may be expressed, he says, in Hume's proposition that every impression has or can have its idea. (2) These secondary mental states occur and recur according to three laws of association. Of these, the first is that similar ideas tend to arouse

one another. (3) The second: Two ideas or impressions which have been frequently experienced together or in close succession tend to arouse each other. (4) The third, "associative principle": A greater intensity in the original experience is equal to greater frequency of experience. (5) Mill notes a kind of uniformity exhibited by some mental states, which had been referred to by Hartley and Mill senior as "mental chemistry." When impressions are experienced together in such a way that each of them readily excites all the rest, there sometimes occurs a fusion of the component impressions similar in kind to the fusion of chemical substances: the component impressions lose their identity in the complex idea, and appear to consciousness not as several distinct impressions, but one. For example,[3] "When seven prismatic colors are presented to the eye in rapid succession the sensation produced is of one color, white. The separate impressions generate a single impression. Again, "Our impression" of an orange consists of the separate impressions of color, form, taste, smell, etc. We can distinguish all these elements. This is not a case of mental chemistry." But "in our impression of extension or distance we cannot distinguish those elementary impressions of eye-strain, etc., in which the complex impression originates, or out of which it is generated." This is a case of mental chemistry, in which "it is proper to say that the simple ideas generate, rather than compose the complex one."

These five steps of uniformity (image-reproduction, the three uniformities of associative recurrence, and psychological chemistry) are all that Mill touches upon. They suffice to illustrate the field of psychology as he conceives it, the "laws of mental phenomena." They do not exhaust that science, even for his own day: he refers his readers to James Mill's Analysis, "where the principal laws of association are copiously exemplified with a masterly hand"; and (in later editions of the Logic) to Bain's The senses and the intellect and The emotions and the will, as "incomparably the most complete exposition of mental phenomena on the basis of a legitimate induction which yet has been produced," and to Spencer's Principles of psychology where "many striking applications of the laws of association to the explanation of complex mental phenomena are also to be found." These titles indicate the drift of Mill's ideas in this field.

Another example of the way in which the moral sciences were related in Mill's mind to the non-moral sciences may be found in his remarks on those of his contemporaries, particularly Comte, who would "reduce" psychology to physiology. Mill's attitude is appreciative, but sceptical and critical. The relation of psychology to physiology is not to be overlooked or under-

valued. Psychological uniformities may be derivative, going back ultimately to physiological uniformities, but to "reject" psychology to attempt to construct a science of mind wholly on the data of physiology, is "an error in principle and in practice." An error in principle, because "uniformities which obtain among mental phenomena do not admit of being deduced from the physiological laws of our nervous system." An error in practice, because "knowledge of them (i.e., of psychic uniformities) for a long time to come must continue to be sought in direct study of the mental phenomena themselves."

These and any other 'laws of mind" compose the most fundamental portion of the science of human nature. Every significant proposition about human nature must be ultimately deducible from these. It may seem a far cry from this handful of highly abstract and general formulations to that "human nature" which we know in ourselves and our friends, which blooms in personal idiosyncrasies and irrationalities, which is revealed to some extent in scores of homely and contradictory maxims and proverbs; but "the truths of common experience, maxims formed aposteriori from observations of life, as merely empirical generalizations in the science of human nature--they depend on and are deducible from the general laws of mind." Mill is fully conscious of the gap between the psychology of the individual and the individual himself; but he insists, "When the laws of mind are better known and more skillfully applied to the detailed explanation of mental peculiarities, they will account for more of those peculiarities than is ordinarily supposed."[4]

This glaring contrast between the rich concreteness of a human character and the rather barren abstractness of association psychology suggested to Mill the need for a science of what he calls "middle principles," a science which would "seek to determine what kind of character will be produced, in conformity to the general laws of mind, by any set of circumstances constituting an individual's environment." This science he proposed to call ethology. "If," he says, "we use the name psychology for the science of the elementary laws of mind, we may apply the name ethology to the science which seeks to determine what kind of character will be produced in conformity to those general laws by any set of circumstances."

Ethology, the science of "middle principles," is to stand midway between psychology and those empirical generalizations concerning human nature, collected by nobody in particular from experience in general, and preserved in the maxims of the poets, novelists, moralists. Like the wisdom of old Cephalus, these generalizations from experience are not to be disregarded or undervalued; but their connexion with the "scientific generalizations"

of a sound psychology must be laid bare, if they are to be adequately understood. Ethology, the science of middle principles, is to bridge this gap. To quote:

> "The lowest generalizations, until explained by and resolved into the middle principles of which they are consequences, have only the imperfect accuracy of empirical generalizations; while the most general laws are too general, include too few circumstances, to give sufficient indication of what happens in individual cases, where the circumstances are almost always immensely numerous."

Of the two sciences of human nature--psychology and ethology--the former alone "has as yet been studied as a science; the latter is still to be created." In a letter to Comte,[5] written shortly after the publication of the Logic, Mill states that he is sketching out this new moral science. But nothing came of it. Really all that remains is the conception of an enquiry into the middle principles. The scope of the proposed science is indicated in rather general terms by a few passages in the Logic. He says, for example, that the subject of ethology is the "origin and source" of all those qualities in human nature which we may wish to produce, avoid, or merely understand. The object is to determine, from the general laws of mind and the nature of man's environment, what combination of circumstances will promote or prevent those qualities. "Human beings," he says, "do not all feel and act alike, even in the same circumstances; but it is possible to determine what makes one feel and act in one way, and another in another. Mankind have not one universal character, but there are universal laws of the formation of character. By these laws, operating amid the different conditions of each particular case, all phenomena of human nature are produced." They are derivative laws from the general laws of mind, but "on them every attempt to construct the science of human nature must proceed."

The great aim of ethology is to afford some means of checking (and validating, if possible) those every-day generalizations about human nature which impressed Mill with their value but shocked him with their looseness and lack of adequate verification. The psalmist, e.g., lays it down that all men are liars. Such hasty generalizations, even if true within the experience of those who make them, do not express laws of human nature. It is not a law of human nature, as such, to be a liar. But it is a consequence of the laws of human nature that lying is nearly universal under certain conditions of, e.g., fear or distrust. Ethology seeks to formulate these "middle laws" in terms of which empirical generalizations may be explained; to ascertain the conditions which produce the phenomena from which empirical generalizations

are made. These generalizations, in Mill's language, are "consequences" of those more basic uniformities. If we know the latter, we know the limits to the empirical generalizations; if we do not, "if we are not able to account for the empirical generalization, there is no safety in applying it much beyond the limits of time and place from which it was made."

Ethology, to repeat, is the inquiry into the manner in which the general laws of mind operate, in the diversities and concreteness of each individual's environment, to produce his character. It is, thus conceived, "the science which corresponds to the art of education in the widest sense of that term." The art of educating, i.e., of character-formation, would be "the mere transformation of the principles of ethology into a parallel system of precepts and the adaptation of those precepts to the circumstances of the individual life."[6]

The enthusiasm and persuasiveness which animate Mill's chapter "On ethology or the science of the formation of character" reveal very clearly the hold which this conception had on his imagination. He describes it as "this important but most imperfect science," and insists that "its creation has at length become possible." It would have been, had he been able to form it, his great contribution to that tradition which he took over from Hartley and his father and passed on to Bain and Spencer. He saw in it the promise of a link between their association psychology, the maxims of common experience, a science of education, and the dawning science of sociology. On it depended the hope of a science of human nature, and, since a society is only a number of individual human beings, the hope also of a science of society. The science of human nature, he says, "may be said to exist in proportion to the extent to which the approximate truths which compose our practical knowledge of mankind can be exhibited as corollaries from the laws of human nature on which they rest." To be able to do this would enable us "to show the limits of those approximate truths and to deduce others from new circumstances, in anticipation of specific experience."

"Next after the science of the individual," says Mill, "comes the science of society." To grasp the scope of this "science of society," one must understand Mill's use of the term "a state of society." Everything turns on this conception. A "state of society" is the simultaneous state of all the great social phenomena: the degree of knowledge, the level of intellectual, moral, and artistic culture, the condition of industry, the amount and distribution of wealth, the occupations of the group, the class divisions and inter-relations, the common beliefs on important subjects, the form of government, the more important laws, institu-

tions and customs. The condition of all such social phenomena constitutes, at any given time, the "state of society." The fundamental problem of the science of society is to find the laws according to which any state of society produces the state which succeeds it.

Mill calls this the "fundamental" problem. His meaning is this: In any state of society there is a necessary correlation among the component factors; not every variety of combination is possible. States of society, that is, exhibit uniformities of co-existence. In a society which has, e.g., churches and colleges, there will not be head-hunting and marriage by capture. Social phenomena exhibit what Mill calls "natural correlations." To quote:

> "When states of society are spoken of as a subject of science, it is implied that there exists a natural correlation among the component elements. Not every combination of these general social facts is possible, but only certain combinations. There are, in short, uniformities of co-existence between the various social phenomena."[7]

Now, these uniformities of co-existence among social phenomena constitute the field of the science which Mill calls, after Comte, Social Statics. His conception of social statics, and the kind of uniformities he believed it would detect, will be noted shortly. The point here is that these uniformities of co-existence among social phenomena are not the most fundamental uniformities investigated by the science of society. They are what Mill has described earlier as "derivative" uniformities, corollaries of more basic uniformities. To quote:

> "The uniformities of co-existence among social phenomena are corollaries from the laws by which these phenomena are produced. The mutual correlation among the elements of any state of society is a derivative uniformity, resulting from the laws which regulate the succession of states of society."[8]

For the immediate cause of any state of society is the state of society preceding it. The fundamental problem is thus to detect the laws according to which any social state produces the social state which succeeds it. These uniformities of succession, which determine the uniformities of co-existence, constitute the field of the science which Mill calls, again after Comte, Social Dynamics.

The articulation of the science of society is thus divided into social dynamics--which aims to detect the laws by which one social state passes into another; and social statics--which aims to detect the necessary correlations which obtain among social phenomena in any social state. Aside from problems of method, which will be examined later, that is the first point to be kept

in mind in reading Mill's pages on what he calls sometimes "general sociology."

The second point, and the one which creates the whole methodological problem, is Mill's conviction that all group phenomena are phenomena of individual human nature generated by the action of the environment on masses of human beings. The uniformities, either of co-existence or succession, exhibited by group phenomena are derivative uniformities, which must be traced back to the laws of individual psychology and ethology. If, he argues, individual human nature is subject to fixed laws, then the phenomena of group life must be subject to fixed laws, the consequences of the preceding. To quote:

> "Individuals in society are still individuals. Their actions still exhibit the uniformities of individual human nature. Individuals are not, when brought together, converted into another kind of substance, as hydrogen and oxygen when united are different from water. Individuals in society have no properties but those which are derived from and resolvable into the nature of the individual."[9]

Social phenomena are cases of mechanical, not chemical, combination. Their laws combine but do not coalesce. However complex the phenomena, their sequences and co-existences result from the laws of the elements. "If, then, the laws of individual psychology and ethology are known, it should be no great problem to determine from those laws the social effects of any given cause operating in society." This conception is so deep seated in Mill's thinking, creates so inevitably the methodological problems of any science of society, and is in many ways so foreign to later social philosophy, that I venture to quote one more passage in which the point is made:

> "With the phenomena of society it is the case that however complex they are, all their sequences and co-existences result from the laws of the separate elements. In social phenomena the effect produced by any complex set of circumstances amounts to the sum of the effects of the circumstances taken singly. The complexity arises from the number and variety of the elements, not from the number of the laws."[10]

This social atomism, I have suggested, created for Mill the methodological problem of a science of society. The laws formulated by social dynamics and social statics must be shown to be derivative laws from those formulated by ethology and psychology. All social-moral laws, in fact, must be traced back to the handful of basic uniformities which constitute the field of psychology. The laws of the come and go of individual "mental states" are the ultimate uniformities to which, theoretically, all others must be

reduced. But how to do this? How proceed to show that the uniformities of co-existence and succession, exhibited by social phenomena, after they have been detected, are derivatives from the more elementary laws of mind? Mill never once loses sight of this double problem confronting an investigator of social-moral uniformities: he was first to detect those uniformities, getting what Mill pleases to call merely empirical generalizations; and then to connect these with the laws of psychology and ethology already established. To quote: "The problem of general sociology is to ascertain these empirical generalizations and connect them with the laws of human nature by deduction" showing that such empirical generalizations are naturally to be expected as the consequences of those ultimate laws." This matter, however, will be examined in the next section of this paper.

The question of how social uniformities are to be detected and verified is one of method. The divisions of social science, its relations to the other moral sciences, and the kind of findings which Mill looked to it to provide, are questions brought together here under the general notion of the articulation of the moral sciences. The two major divisions, social statics and dynamics, have been noted; its relations to psychology and ethology have been indicated; there remains principally to enquire what kind of generalizations Mill hoped to draw from investigations so conceived.

The main benefits would be an understanding of how any social state came to be what it was and the power to foresee what it will become. He states this in general terms in saying that "the science of society would have reached a high point of development if it enabled us to understand what causes had made any social condition what it was, whether it was tending to any changes, what effect each feature of its present state would produce in the future, and by what means those effects might be prevented, modified, or accelerated." The same hope, in more particular terms, is revealed in his remark that a special case of the general inquiry would be concerned with what effect would follow from any given cause in any specific country: "What would be the effect of imposing or repealing corn-laws, of abolishing monarchy, of introducing universal suffrage in the present condition and civilization of any country in Europe?"

General sociology, including social statics and social dynamics, does, in a sense, cover the entire field of social phenomena. The key conception, underlying both statics and dynamics, is what Mill calls, after Comte, the social "consensus." I have reserved it for consideration at this point because it enables one to grasp most easily Mill's treatment of two subsidiary social

sciences, namely, political economy and political ethology.

The term consensus is used by Mill to denote "the existence of a necessary relation among all the possible aspects of the same social organism." Quoting from Comte he says, "From whatever element in a society we set out, we may easily recognize a connexion, more or less immediate, with all the other elements." It is Tennyson's little flower in the crannied wall transplanted into sociology. Whatever affects any one element of social condition affects all the other elements.

> "We can never understand any society in one respect without considering it in all respects. There is no social phenomena which is not influenced to some degree by every other factor in the same society. This is what physiologists term a consensus, similar to that which exists among the various parts and organs of the human body."

To analyze a social consensus, to detect the "natural correlations" which it exhibits, is the aim of social statics. To formulate the laws by which one social consensus succeeds another is the aim of social dynamics. And, as the consensus includes all the phenomena of a given state of society, these two major divisions of general sociology would seem to exhaust the field between. Mill could not blink the fact, however, that the most flourishing, if not the sole, social science in his own day was neither social statics nor social dynamics, but political economy. And it boasted, in the mouth of Ricardo, of considering only one aspect of society. The fact of a social consensus means little enough in the pages of the classical economists. This led Mill to modify slightly the rigidity of the said consensus.

> "Notwithstanding this universal consensus of social phenomena, whereby nothing takes place without influencing every other part, it is also true that different classes of social facts are in the main dependent immediately on different classes of causes, and may therefore be studied apart, just as the physiology of the principal organs may be studied separately. On this fact is grounded the existence of separate, though not independent, branches of the science of society."

One large class of such phenomena is that in which the immediate causes are principally those which act through the desire for wealth. By reasoning from the one law of human nature that in these matters a greater gain will be preferred to a less, the economist seeks to explain and predict this class of phenomena. He takes no other motive into account. He abstracts, for his special purpose, those phenomena in which he is interested. For this reason Mill describes economics as an abstract science, and insists

that its conclusions are only "abstractly or hypothetically" true; true, that is, so long as they are not taken as holding for the concrete setting in which the data occur and from which they have been, conceptually abstracted. While insisting on the abstract nature of economic theory, Mill feels none the less that "the separation of this portion of the phenomena of society, and the creation of a distinct science to deal with them, is justified by the fact that they do, mainly, depend on one class of causes only"; and that even when other causes are operative, the task of detecting "the effects due to the economic motive is sufficiently intricate and difficult to make it expedient to perform it once and for all and then allow for modifying circumstances." Abstract though this science might be, Mill's description of "what it aims to show" is considerably more concrete than in the case of any other moral science. "Political economy," he says, in a remark which might well have been taken from the table of contents in any of the current treatises,

> "considers mankind as occupied solely in acquiring and consuming wealth. It aims to show the course of action into which mankind would be impelled if that motive were absolute. Under the influence of this desire it shows men accumulating wealth; employing that wealth to produce more wealth; sanctioning by mutual agreement the institution of property; establishing laws to protect property rights; adopting measures for increasing the productivity of their labor; settling the divisions of the produce by agreement under the influence of competition; and employing such expedients as money, credit, banking, etc. to facilitate the distribution."

Mill suggests one other hypothetical or abstract social science, "similar to political economy in that it may admit of being carved out of the general social science." He would call it "political ethology." Its field would be "the causes which determine the type of character belonging to a people or an age." Mill's ideas on the subject of political ethology are scanty in the extreme. He says, what his own pages amply reflect, that "of all the branches of social science this is the most completely in its infancy. The causes of national character are scarcely understood at all." Nor is this to be wondered at "when we consider the infant state of the science of ethology itself, from whence the laws, of which the truths of political ethology are derivatives, must be drawn."

Mill's pages on political ethology are devoted principally to showing how important it is that such a science be created. He says of it, that it is, like political economy, concerned with the

uniformities of only one class of social facts. This is clear enough. But it is not so obvious that these facts are "in a sufficiently close dependence on a peculiar class of causes to make it convenient to create a preliminary science of these phenomena." What in ethology is the "peculiar class of causes," supposed to be analogous to the desire for wealth in economics? This is nowhere indicated. But what Mill omits in the way of concrete details in this connexion he makes up in his picture of the value of a sound political ethology. "The laws of national character are the most important class of sociological laws." The importance of this proposed "social psychology" rests chiefly in the light it throws on the interrelations of the moral sciences as Mill conceived them. If we ask ourselves why "the laws of national character are by far the most important class of sociological laws," and note Mill's answers, we shall have gathered everything that he has to say on the subject of political ethology. In the first place, the character which is formed by any social environment is itself the most interesting phenomenon which that society can present. In the second place, the character of a people in any social state is an important factor in the formation of the character of those who come after them. In the third place, the character of any group of people is the most important factor in the formation of laws or customs; either by the direct influence of public opinion on the ruling powers, or by the indirect effect which public opinion has in determining the form of government and the character of the governors. In the fourth place, a sound political ethology is the indispensable supplement to any abstract science, e.g., economics, whose "abstract' truths require to be supplemented by generalizations not thus abstract. To quote:

> "In political economy, for instance, laws of human nature are tacitly assumed by English thinkers which apply principally for England and the United States. An English economist has seldom learned that some men care more about their ease or vanity than their pecuniary gain."

This omission is no defect in classical economics, qua abstract. But it "vitiates" its conclusions with regard to cultures and societies of different character. Such a defect would be supplied by a science which would formulate the uniformities exhibited by the formation of group character. The progress of such an enquiry sets the limits to these abstract sciences. Until political ethology is well advanced, "those social phenomena alone can with advantage be made the subject of separate sciences, which are influenced only in a secondary degree by diversities of character between different nations or different times." Those fields of

enquiry in which the character of the people is of primary importance, so that the phenomena cannot be marked out without taking "ethological uniformities" into consideration, "cannot with advantage be treated of independently of political ethology." For this reason Mill sees no hope of a separate "science of government," like economics, for some time to come. "There can be no separate science of government; for government, of all things, is most mixed up with the qualities of the particular people or age."

These, then, are the moral sciences whose "logic" Mill aimed to exhibit. Most of his ideas have been criticized or merely ignored. This is not a matter for surprise. They are too obviously the fruit of "armchair" science. But it cannot be repeated too often, in justice to these ideas, that they were conceived by him as constituting a kind of organon and program for the social sciences. He had no illusions regarding the limitations of what he could do. "I am not unmindful how little can be done in a mere treatise on logic, or how vague and unsatisfactory all precepts of method must appear when not exemplified in the establishment of a body of doctrine." But there is something to be said, in the early days of any science, for the attempt to do just what Mill set himself to do, namely, to "show how the moral sciences could be constructed," to indicate their natural interrelations, to block out the field, to raise questions of method, and assess their probable limitations. One of the most significant features of Mill's chapters on the logic of the moral sciences is to be found in his insistence on the need for a theoretical interest in these matters, divorced from all utilitarian considerations. "Until lately," he says, "the science of society has been similar to the science of medicine before anatomy and physiology began to be cultivated." In early medical science inquiry was limited to practical questions--What diet is wholesome? What medicine will cure the disease?--without systematic inquiry into the laws of nutrition or physiology or pathology, on which the effects of any diet or any medicine must depend. Similarly, in "politics," the precursor of social science, the questions were practical--Will this piece of legislation or this form of government be beneficial or the reverse?--without systematic inquiry into the conditions which determine the operation of legislation or the effects of forms of government. "The statesmen thus sought to study the pathology and therapeutics of the body politic before they had studied its anatomy and physiology; to cure its ailments without understanding its laws." To have perceived this need for a "scientific" treatment of the problems of human nature and society, and to have insisted upon it at great length, in the England of 1840, when the notorious policy of

"muddling through" was in its hey-day, is no slight achievement. Bacon did no more for the natural sciences some three centuries earlier.

2. The Method of the Moral Sciences

"The philosophy of science," Mill wrote, some years after the publication of his Logic, "consists of two principal parts: the methods of investigation and the requisites of proof. The first points out the method by which we arrive at our conclusions; the second, the method by which we test their evidence. The first, if completed, would be an organon of discovery; the second, an organon of proof." In a general way, he had attempted to work out the "philosophy of science," so conceived, in his System of Logic; and, in Book Six, to indicate the bearing of such ideas on the "moral" sciences. The "logic of the moral sciences" meant, for him, the consideration of the methods by which the mind attains the truths of those sciences, "a survey of the resources which the mind has at its disposal for investigating the laws of such phenomena, the circumstances which render each of the methods of exploration suitable or unsuitable to such phenomena, the extension and transformations which the process of investigation undergoes in being adapted to each new province" of this field of study. To do just this is the principal aim of the sixth book of his Logic. The program, regrettably, is not carried out with equal thoroughness for each of the moral sciences. He has worked out these problems in more detail for some of the sciences than for the others. In spite of this uneven distribution, Book Six does provide more discussion of such matters, with respect to the early sciences of human nature and society, than any document published before or since, so far as my knowledge extends. What Mill has to say regarding the methodology of the moral sciences may be open to all manner of criticism and ridicule (it seems to have encountered only neglect), but the interesting fact remains that he alone tried his hand at the task. The chapters, in spite of a superficial clarity, do not move steadily and clearly to their conclusion. Considerable extraneous material, which may have loomed large in Mill's eyes when he was writing, now serves only to obscure the ground plan of the Book. But Mill had a rather well-defined conception of the methods and interrelations of the moral sciences. They formed for him a kind of hierarchy of increasing complexity. The plan of Book Six is to exhibit this inter-dependence and to point out the methods which he thought were proper to each level of complexity.

As the previous section indicated, the "moral sciences" were psychology, ethology, political economy, political ethology, social statics, and social dynamics. In bringing together Mill's remarks on the methods proper to each of these sciences, it may be

necessary to repeat something of what has been said with reference to their articulation. I shall keep this repetition to a minimum, but that minimum seems unavoidable because of the fact that the methodological problems are created, to a certain extent, by his conception of their hierarchal interdependence.

There are, Mill reminds the reader, only three methods by which the uniformities of nature can be detected: "mere" observation, controlled experiment, and deduction (direct and inverse). His aim is to show, for each moral science, which method is most appropriate.

"The subject of psychology is the uniformities according to which one mental state succeeds another." Mill refers elsewhere to these uniformities as the "elementary laws of mind," and because they are elementary, i.e., not derivatives, there is no other method of detecting them than "the ordinary methods of experimental inquiry; nor could they be ascertained in any other way." This point is nowhere developed, due no doubt to its rather self-evident nature. Ratiocination, because it requires "previous inductions," could not be used to search out the elementary uniformities in any science. Writing in the Westminster Review some years later Mill remarked to this effect: "In general, induction furnishes the laws of the elementary facts, from which those of the complex combinations are thought out deductively."

However, these elementary laws having been thus obtained, the question is, "How far can they be used to explain the actual phenomena? Complex uniformities not only may, but must, be generated from these simple laws." This question leads him directly to a consideration of his proposed science of "ethology."

"The subject of ethology is the laws of the formation of character," of its formation, in terms of the elementary laws of association which control the come and go of "mental states." As Mill repudiates the inductive method very emphatically at this first move from the basic science, the relation of psychology to ethology must be kept clear. It amounts to this: The uniformities according to which a class of phenomena is produced may be few and simple, while the phenomena themselves may be so complicated that no regularities are detectable in them. This would be the case where many circumstances entered into the production of the phenomena, but entered according to a few simple laws. If the circumstances were sufficiently numerous, few or no uniformities would be detected. The presence of the few simple laws might be unsuspected. Now a man's character, his "nature," is a case in point. His "character," Mill would argue, is only a name for the ways in which the few simple laws of association

have become "set." The problem is to discover precisely how so many different "characters" are possible on the basis of only a few simple laws. Psychology, the inquiry into the few simple laws of mental states, leads directly to ethology, the inquiry into the way these laws operate in the complex conditions constituting an individual's environment. In more recent terminology, human beings do not all react in the same way to the same circumstances, but it is possible (Mill's conviction!) to detect the uniformity according to which an individual in a specific case reacts as he does. In his own way Mill is saying just this when he says:

> "Men may not have one universal character, but there are universal laws of the formation of character. These laws are the ways in which the elementary laws of association operate in the varying circumstances of each case to produce all the phenomena of human action and feeling."

All that passes through a man's mind is determined by a few simple laws. Every circumstances in a man's environment which influences him to any considerable degree, does so according to those few simple laws. Ethology, to repeat, is the inquiry into the way in which these laws operate, in the complex conditions constituting an individual's environment, to produce that individual's character. It is thus related to psychology as some branches of physics are related to mechanics.

This being the relation between psychology and ethology, the problem Mill faced was to show which of the several methods might be expected to prove fruitful. He considers first simple observation, and rejects it. His arguments may be condensed: Consider the difficulty--which confronts an investigation by simple observation--of ascertaining in each case examined what actually is the character of the individual. There are differences of opinion even among a man's intimate friends concerning some essential part of his character. Moreover, no single action, no conduct over any short period, goes far toward revealing it. We can only make our observations in a rough way, not attempting to ascertain precisely what character has been formed--still less by what causes. The most we can get by observation is the circumstances in which certain marked qualities or deficiencies oftenest exist. Even these conclusions, unless they are based on observation of a sufficient number of instances to eliminate both chance and every circumstance in which some of the cases may have resembled one another, deserve no reliance. Moreover, the circumstances which form individual character are so many and varied that one can hardly ever say that any particular combination produces some definite and strongly marked character found always

where that combination exists but not otherwise. The most extensive and accurate observation will yield at best only a comparative result; as, e.g., that a given number of Frenchmen will contain more individuals of a particular tendency of character than a similar number of Italians or English or Germans. But such a comparison is merely one of the ratios and degrees; and since in proportion as differences are slight it requires a greater number of instances to eliminate chance, it cannot often happen that anyone will come to know enough cases with the required amount of accuracy. These objections against simple observation as a method for detecting ethological laws are supplemented by one other, which I shall postpone for a paragraph.

He considers next controlled experiment and rejects it. His arguments may be condensed: For an experimental inquiry into the laws of the formation of character one would require a number of human beings to bring up and educate from infancy to maturity. One would require to know and record every sensation received by each subject long before it could speak; including its own notions respecting the sources of all its sensations. The record would have to be almost exhaustively complete. One apparently trivial circumstance, unnoted, might set up a train of ideas and associations sufficient to vitiate the experiment as an authentic exhibition of the effects of given causes. It is interesting to compare such a program with one not unlike it prescribed by J. B. Watson in his recent Psychological Care of Infant and Child. Mill scouts the idea of meeting these requirements, on two counts: (1) "No one but an oriental despot" would have the power; or, if he had, would be disposed to use it; (2) No one, even if he had the power to isolate and control a sufficient and varied number of subjects, could carry out the program with scientific accuracy. It would "not only be impossible to do this completely, but even to do so much of it as should constitute a tolerable approximation."

So much, then, for an experimental investigation of ethological phenomena. Mill believed, however, that both observation and experiment were open to a more fundamental objection. This "final and conclusive" criticism, which seems to be something of a petitio principii, amounts to this; even if it were possible to arrive at generalizations by observation or experiment, they would still be only "empirical generalizations," i.e., expressions of uniformities known to hold true within the limits of experience but not beyond these limits. To use Mill's phrase, "We would not know why they were true." They would derive their truth from those more elementary laws of which they are a consequence. Unless we can connect such "empirical laws" with the more fundamental laws,

"there is no safety in applying them beyond the limits of the experience within which they were found." Ethological laws, almost by definition, are "derivative" laws, resulting from the general laws of mind. To "give a scientific character to these empirical generalizations, they should be connected with the laws from which they result." Again:

> "One need not expect that empirical generalizations, made without reference to the underlying causes, should be anything but approximate. Unless we have resolved the empirical generalizations into the laws on which they depend, and found that those laws extend to the cases from which the empirical generalization was made, we cannot rely on it."

"Since, then, it is impossible to obtain accurate propositions, respecting the formation of character, from observation and experiment, we are driven to what would have been the most perfect method, even if it had not been indispensable"--the deductive method of preliminary induction, ratiocination and verification. This method, Mill believes, is forced on an investigator because of the derivative nature of ethological laws. To quote: "The laws of the formation of character are derivative laws, resulting from the general laws of mind, and are to be obtained by deducing them from those general laws by supposing any given set of circumstances and then calculating what, according to those general laws, would be the influence of those circumstances on the formation of character." This passage gives both the method of Mill's "ethology" and its connexion with the more fundamental science of psychology. Psychology is an observational and experimental inquiry. Ethology is deductive. The former deals with the laws of mind in general; the latter with their operation in complex combinations of circumstances. To quote: "Ethology is a system of corollaries from psychology."

There are three parts to this deductive procedure: (1) the established elementary laws, (2) the calculation or "ratiocination" in terms of these laws, (3) the verification of the conclusions by a checkup with any "empirical generalizations" which happen to be available. Having this in mind Mill can see no reason why the discovery of ethological laws should not proceed. "Ethology is still to be created," he admits, "but its creation has become practicable." The laws of association psychology--the premises for the ratiocination--"are now sufficiently complete for a competent thinker to deduce, with a considerable approach to certainty, the particular type of character which would be formed by any set of circumstances." There exists an abundance of empirical generalizations available as verification of the theoretically deduced conclusions. "A science of ethology, founded on the laws of psychology, is therefore possible." Mill was sufficiently convinced of this to devote a good

part of two years to attempting to work out the elements of ethology. Progress would depend on two processes: (1) deducing the ethological consequences of particular sets of circumstances and comparing such a priori conclusions with the findings of common experience; (2) increased study of various types of human nature with a view to (a) analyzing and recording the circumstances in which each type prevails and (b) accounting for the characteristics of the type in terms of psychological laws and the peculiarities of the circumstances.

Mill closed his chapter on ethology with a paragraph which conveys so clearly what he conceived to be the aim and procedure of "this important but imperfect science" that it may be condensed here: It is hardly necessary to repeat that verification must proceed pari passu with deduction. Theoretical inference as to the type of character which would be formed by any set of circumstances must be tested by specific experience of those circumstances where possible. The conclusions of the science as a whole must be constantly verified and corrected by the generalizations of common experience concerning human nature in our own age, and of history concerning human nature in times past. The conclusions of theory cannot be trusted unless confirmed by observation; nor of observation, unless they can be deduced from the laws of human nature and a close analysis of the circumstances of the particular situation. The consilience of a priori reasoning and specific experience is the only ground for the principles of any science dealing with such complex and concrete phenomena as the formation of human character.

"Next after the science of the individual comes the science of society, of the masses of mankind and the phenomena which constitute social life." This "science of society," it will be remembered, comprised social statics, social dynamics, political economy, and political ethology. There were important questions of method to be decided for each. The consideration of these issues brings Mill finally to grips with the problems raised by Macaulay in his critique of the older utilitarians. The analysis of scientific concepts, the formulation of scientific methods, the sketch of two preliminary sciences of human nature, were all, in a sense, prolegomena to his pages on the science of society. What he learned from Bentham, from his father, from Herschel, from Whewell, from Comte, all converged to form his ideas on this subject.

Mill's pages on the methods of "the science of society" cover three topics. He first describes and rejects the principles advocated or employed by Macaulay, by the Benthamites whom he had criticized, and by certain "advanced thinkers on the continent." Having settled "these erroneous methods" he describes and accepts

the "inverse deductive method" worked out by Comte. And, finally, since Comte's inverse procedure made no provision for political economy and political ethology--Comte had refused to recognize the former of them as a science--he explains in some detail just how these subsidiary social sciences must avail themselves of the direct deductive method of astronomy, ethology, and other a priori sciences.

It may be well to remind ourselves of Mill's conception of the aim of social science. It is twofold. It may take the form of an investigation of what effects follow from a particular cause under any specific conditions; what, e.g., would be the effect of imposing or repealing corn laws; of abolishing monarchy, of introducing votes for women or prohibition of strong drink, etc., in the England of 1840. Or it may take the form of an attempt to detect the laws which operate in all societies, "the causes which produce and the phenomena which characterize societies generally." Mill's problem is to indicate the methodological principles which seem to him appropriate to the prosecution of such enquiries. But before stating his own convictions he felt the need to clear away certain misconceptions current in his own day. "That what I consider the true method may be made more palpable, it will be expedient to characterize certain radical misconceptions entertained by almost all who have meditated respecting the logic of politics since the notion of treating it by strict rules has been current among the more advanced thinkers."

The first of these "radical misconceptions," described by Mill as the "chemical or experimental method," may be found in the pages of Macaulay's essays on the utilitarians. Mill does not mention Macaulay by name in this connexion. But it seems obvious that he had him in mind. Macaulay had written that "the latent principle of good government ought to be tracked in the same manner in which Bacon proposed to track the principle of heat: Examine those constitutions under which the blessings of good government are enjoyed and discover, if possible, in what they resemble and in what they differ from those under which good government does not obtain." [11] Elsewhere Macaulay had asked himself how conclusions are to be reached in the investigation of social and political problems, and had answered: "By that method which, in every experimental science to which it has been applied, has increased our knowledge and power--by the method of induction, by studying the history of the past, by sifting the evidence of the facts, by combining and contrasting those that are authentic, by generalizing with caution," [12] and so on.

Mill is at great pains to eject this high empiricism from the field. He describes those who "countenance" such principles as persons "who have heard that Bacon taught mankind to follow

experience and to ground their conclusions on facts; who think that by treating political facts in an experimental method they are showing themselves true Baconians; but who know nothing of the methods of physical science beyond a few precepts which they continue to parrot after Bacon, unaware that Bacon's conception of scientific method had done its work and that science has now advanced into a higher stage."[13] Their fundamental ignorance of the scientific method, and its application to politics, is so great that "the kind of arguments from experience which they bring forth are such as, at no time since Bacon, would have been admitted to be valid in any experimental science." Mill's elaborate and painstaking opposition to this appeal to experience seems, at first sight, something of a tu quoque in one who represented so thoroughly the tradition of British empiricism. The very fact of his own empiricism, I suspect, gave considerable appeal to the claims of these latter-day Baconians. But the inconsistency is no more than superficial. At no time does Mill consciously abandon his empiricism on these points. His advocacy of "deduction" in science, as a method, does not cancel his more deeply rooted advocacy of "induction" in epistemology. No matter how vehemently he criticizes Macaulay and others for seeking to be "experimental" and "a posteriori" and "inductive" and "empirical," he does not conceive himself as obligated to surrender his own conviction that inference is from particular to particular. His criticism is directed against the "inductive" method of obtaining the particulars; not against reasoning in terms of them.

Mill criticizes Macaulay's appeal to experience on three counts. These may be condensed as follows:

(1) The first objection to an attempt to apply experimental methods to detecting the uniformities exhibited by social phenomena is the impossibility of performing, not to mention repeating, experiments. This initial impossibility is supplemented by a second, that, namely, of "ascertaining and taking note of all the relevant facts of each case." Mill does not waste much space on this question: "We palpably never have the power of trying any experiment. We can only watch those which nature produces." The upshot of this is that an "appeal to experience" can only mean an appeal to observation. If the spontaneous instances exhibited by past and contemporary history afford a sufficient variation, an induction from observation would be possible. But do they? "The question is, Are the requisites for induction respecting the causes of political effects to be met with in history?" These "requisites for induction" of which Mill speaks are the conditions necessary to an application of the five "canons" which he had taken over from Herschel and elaborated in the Third Book of his Logic.

(2) The second objection to an "appeal to experience" in these matters is the fact that the "requisites for induction" are not to be met with. Mill devotes an entire chapter to exhibiting the impossibility of working the canons in the field of social phenomena and processes. There does not seem to be any need to retrace his arguments in detail. The method of difference, e.g., would require that the societies (or social situations) tally in every particular except the one which is being investigated. If, as Mill suggests, the problem is to detect the effect of tariff on national wealth, one would require "two nations alike in all natural advantages and disadvantages; whose people resemble each other in every quality; whose customs, opinions, laws and institutions are the same"; whose economic structures are the same, except that one has more tariff than the other. If, when these and other conditions of similarity are met, one of the two nations is wealthier than the other, one would have "a real proof by experience which economic system is the more favorable to national riches." But the notion that two nations could be found identical in all respects but one, is"manifestly absurd." Such a concurrence is not even abstractly possible. To quote: "Two nations which agreed in everything but their tariff policy would agree also in that." If two nations differ in this respect, it is from some deeper difference in their position, in their interests, or some other respect--a fact which forces one to admit the possibility of further differences without assignable limits. "There is thus a demonstrated impossibility" of obtaining, in social investigations, the conditions required for the application of the "most conclusive" of the inductive canons.

Mill has little difficulty in "demonstrating," to his own satisfaction, the impossibility of obtaining in sociological inquiries the conditions required for the application of the remaining canons. The indirect method of difference requires two classes of instances agreeing in nothing but the presence of a factor in the instances of one class, and its absence from the instances of the other class. Could this requirement be met in the field of large-scale social phenomena? "Is it necessary to consider the impossibility of ascertaining, from history or contemporary observation," the fact that groups of nations agree in precisely this fashion? The method of agreement, it will be remembered, is of little or no value where there is a possible plurality of causes: "and social phenomena are those in which the plurality of causes prevails to the utmost extent." Similar difficulties stand in the way of a satisfactory recourse to the method of concomitant variation: "Every attribute of the social body is influenced by innumerable causes, and the mutual inter-

action of the elements of society is such that whatever affects one of the more important will affect the others directly or indirectly." The method of residues is barred from the first. It is never available in cases where investigation must begin with observation and experiment: it presupposes previous conclusions, and "as we have shown that these cannot have been obtained by the other methods, they must have been obtained by deduction." But this is fatal to any consistent appeal to experience.

(3) The third objection to radical empiricism in social science, the objection implied in Mill's description of it as the "chemical" method, is directed toward what he believed to be a misconception of the nature of social phenomena. This point has been touched on once before. But it is so fundamental to Mill's theory of human nature and society that it will bear repeating. The laws of social phenomena, he is never weary of reminding his reader, are nothing but the laws of the human beings united together in a group. Men in a state of society are still men; their actions and passions are still obedient to the laws of individual human nature." Men are not, when brought together as a social group, converted into another kind of substance with different properties; as hydrogen and oxygen are different from water. "Human beings in society have no properties but those which are derived from the properties of individual man."

Now, the insistence on observation and experiment as the sole methods of detecting the uniformities exhibited by social phenomena, suggested to Mill that "this fundamental truth" was being overlooked. "The method which may be termed chemical overlooks this fact and proceeds as if the nature of man as individual were not concerned at all, or only in an inferior degree, in the operations of human beings in society." Macaulay in particular has criticized the Benthamites for their attempts to "deduce" a theory of government from "principles of human nature." I have quoted elsewhere in this paper a passage in which he twits James Mill with being a medieval Aristotelian born out of time. It is this aspect of the matter which is uppermost in young Mill's mind when he protests against the "chemical" method in social science. "Reasoners of this sort," he says, "object to all reasoning in political or social affairs which is grounded on principles of human nature, as "abstract theory." For the direction of their opinions and conduct they profess to demand in all cases specific experience." He therefore describes their method as "chemical." The term is not inappropriate: Chemical substances, when brought together, are converted into another kind of substance, with different laws and properties. The laws and properties of the substance formed by combination cannot be deduced from those of the component substances. They must be learned by observation. They provide no

grounds for "ratiocination." And any social theorist who protested too vehemently against ratiocination from the laws of human nature, Mill suggests, must be harboring the misconception that human beings are, in this respect, like chemical substances.

The second "radical misconception"--the geometrical method--is described by Mill as "peculiar to studious minds." Whatever divided allegiance he may have felt in criticizing the "appeal to experience," he seems to have felt still more keenly the virtues of the second approach. He is at great pains to assure his reader that the "geometrical" method in social science would have occurred "only to persons acquainted with the nature of scientific research"; aware of the impossibility of detecting uniformities among phenomena so complex, by mere observation or experiment.

By the "geometrical" method Mill means the attempt to deduce sociological laws from a single "principle" of human nature. To quote: "In the geometrical theory of society it seems to be supposed that each phenomenon results always from one force, one single property of human nature." Hobbes and the Benthamites are cited as "geometrical philosophers." To quote: Hobbes is among those "who assume, as the principle of their political philosophy, that government is founded on fear; that fear is the one motive by which human beings are brought to form a society." Again: "Hobbes assumed this proposition and attempted to build a complete science of politics upon it." Had Hobbes been the only political philosopher to employ this narrowly deductive method, it is unlikely that Mill would have dealt so gingerly with the matter. But a stone cast at Hobbes, on this score, was something of a boomerang, since "the most remarkable example in our times of the geometrical method in politics is the interest-philosophy of the Bentham school." This fact created for Mill the delicate task of admitting the methodological fallacy underlying his father's Essays on Government, without at the same time committing himself to Macaulay's taunts about medieval Aristotelianism born out of time. Hence: "These profound and original thinkers founded their general theory of government on one premise, namely, that men's actions are determined by their interests." That "profound and original" is to clear the air of any suggestions of "scholasticism in political theory."

Mill's objection to his elders was not directed against their attempt to proceed deductively. That was a move in the right direction: "They perceived that the science of society must be deductive." They sought "recourse to the simple laws which operate in social phenomena." What he criticized was their attempt to perform their deductions from one law only: "There is no social phenomenon over which innumerable forces do not exercise influence; which do not depend on the conjunction of many

causes." This point is implied in his use of the term "geometrical." One difference, in Mill's eyes, between geometry and the physical sciences was that geometry takes no account of conflicting forces, of uniformities which counteract or modify each other. In the field of the physical sciences two or more forces may counteract. In the field of the geometrical sciences this does not occur. The consequences of one geometrical principle never conflict with those of any other: a deduction from one axiom is never counteracted or modified by a deduction from some other axiom. In the field of the social sciences this is not the case. Hence the fallacy of a deductive procedure using only one law, whether of fear or interest. "In the geometrical theory of society it seems to be supposed that each phenomenon results from only one force, one property of human nature." That is Mill's sole objection: "It is unscientific to construct a theory out of a few--let alone one--of the agencies by which phenomena are determined, and leave the rest to conjecture." Either we ought not to pretend to scientific forms, "or we ought to study all the determining factors equally." Social phenomena "do not depend on some one law of human nature. The whole of the qualities of human nature influence those phenomena. There is not one, the removal of which would not affect the whole of society and change the sequences of social phenomena generally." The "true" method, it appears, is only an extension of the geometrical. It is that method "which proceeds, conformably to the practice of the more complex physical sciences, by deduction from many premises, considering each phenomenon as the effect of many causes, inferring the law of each effect from the laws of the causes on which it depends, considering all the causes which conjointly produce the effect, and compounding their laws." This "true" method, since it does not abstract one or a few principles, Mill describes as the concrete deductive method.

The third misconception, "far superior to either the chemical or geometrical method," is one which, Mill tells us, "is generally adopted by the most advanced thinkers on the continent." It brings us very close to Mill's own convictions on these matters. He does not refer to it by any particular name. The one fact which he is at great pains to make clear is that this third candidate rests squarely on one very sound conception, that, namely, of "social progression." The meaning of this term is as follows: The conditions in which human beings are placed operate, according to their own laws and the laws of human nature, to form the characters of human beings. But human beings, in their turn mould the conditions for themselves and those who come after them. From this reciprocal action there results a "progression," a change in human nature and its environment from age to age. "In each successive age the principal phenomena of society differ from what they were

in the age preceding, and still more from what they were in ages preceding that." This progression has no necessary connexion with progress. "It is conceivable that the laws of human nature might determine changes in man and in society which might be improvements." What was later referred to as "Mr. Spencer's New Jerusalem" is thereby removed from the realm of the necessary to the realm of the possible.

This conception of a social progression, when properly used, leads directly to the "inverse deductive or historical method" which Mill believed to be the method which is peculiar to the science of society. It was so used "by Comte alone, among the new historical school," however. Its misuse by "some of the most advanced thinkers on the continent" must first be noted. Mill does not state who these "advanced thinkers" are. But he makes the nature of their "advanced thinking" abundantly clear. They attempted, by a study and analysis of the facts of history to discover the "law" of social progression. Once they had detected this law, they hoped to be able to predict future events, "just as the law of an algebraic series enables us to predict the rest of the series to any number we please." There was much in this notion that would appeal to Mill. "I gladly acknowledge the great services which have been rendered by this school."

In spite of this glad acknowledgment, however, Mill "cannot but charge them with a fundamental misconception of the true method of social philosophy." Their mistake consisted in supposing that any order of succession which we might be able to detect from an examination of the history of any society would be anything more than an empirical generalization. There would not, on Mill's analysis, be a separate law of progression controlling the succession of social states. Such a law would depend on the psychological and ethological laws which control the action of individuals on their environment and vice versa. It is theoretically possible that the said elementary laws might determine the succession of one state of society by the next in one unvarying order, like the order of a mathematical series. But, even admitting such a highly speculative possibility, the fact would remain that the discovery of any such unvarying order, would amount only to an "empirical law " until it had been connected with the psychological and ethological laws on which it depended. "M. Comte alone, among the new historical school has seen the necessity of thus connecting generalizations from history with laws of human nature."

It may be worth while to bring together at this point the conclusions which seem to emerge from Mill's critical examination of these three "misconceptions" of the method of social science. The double problem of sociology--to adopt what Mill calls a "polite barbarism"--is to determine (1) what effect will follow from some

particular cause in any specified society; (2) what laws or co-existence and succession characterize states of society generally. The experimental method is useless because experiment is impossible in the field of social enquiry. The observational method is useless because of the impossibility of applying the canons for the determination of causal connexion. Both methods, aside from the difficulty peculiar to each, would yield only empirical generalizations since they make no provision for connecting their findings by deduction (a priori) with the psychological and ethological laws upon which they depend. The abstract method is more scientific than the observational or experimental precisely because it does represent an attempt to deduce social phenomena from a law of human nature. Its weakness resides in the fact that social phenomena are the product of many laws of human nature. The unnamed method of seeking to detect the law of social progression from an examination of the history of societies is to be commended for the emphasis which it places on the fact of progression in social phenomena; but it, too, would yield only empirical generalizations which would still require to be connected with the laws of human nature as suggested above.

The upshot of all this is to prepare the way for Comte's "inverse deductive or historical method." One can lay down in advance some of the conditions which that method must meet. It must not be wholly observational or experimental; must proceed by deducing its conclusions from ascertained laws of human nature; must allow for the fact of social progression; must draw largely on the data of history and must correlate historical generalizations with the laws of human nature.

"The method proper to the science of society," Mill wrote in an article on Comte, "must be, in substance, the same as in all the other sciences--the interrogation and interpretation of experience by the twofold process of induction and deduction. But its mode of practicing these operations has features of peculiarity."[14]

Now, to understand these "features of peculiarity" it is necessary to have before us some of the ideas set forth in the previous section of this paper. The key conception in the science of society, it will be remembered, was the "social consensus," the natural correlation exhibited by social phenomena. Social statics was to be the enquiry into the structure of the social consensus, the attempt to determine what elements are compatible in any social consensus. Social dynamics was to be the enquiry into the laws by which one social consensus succeeds another. "The general science of society" is the systematic effort to detect "the causes which produce and the phenomena which characterize states of society generally." The laws of social statics, however, are doubly derivative; they derive ultimately from the psychological and ethological

laws of individual human nature; and they derive, less ultimately, from the laws of social dynamics. "Uniformities of coexistence must be corollaries from the laws of succession by which the coexisting phenomena are determined." That mutual correlation between the elements of any social consensus, which it is the aim of social statics to detect, results from the laws which regulate the succession of one social consensus by another. "The fundamental problem, therefore, of social science is to find the laws according to which any state of society produces the state which succeeds it." This "fundamental problem" appeared insoluble to Mill by any of the methods already examined. Experimentation in such matters is impossible. Observation is hopelessly inadequate. Deduction, as attempted by Hobbes, Bentham, and the elder Mill, from one single law of human nature, is too narrowly based. It involved the danger of what Whitehead would call "misplaced concreteness." The aim of the French historical school to detect a law of social change pointed in the right direction, but ignored the necessity of correlation between any such law and the basic psychological and ethological laws of which it would be only a function.

The "peculiar features," then, of the way in which induction and deduction are practiced in the science of society, are seen to be due to the fact of social progression (i.e., cumulative change) and to the need for exhibiting a functional correlation between any "law of progression" and the laws of human nature.

Returning to Mill's exposition of Comte's inverse deductive method, we may resume our account from the point at which he had mentioned certain "features of peculiarity" due to the nature of social phenomena. The argument may be condensed as follows: In the more complex physical sciences induction furnishes the elementary laws from which the laws of the complex phenomena are thought out deductively and verified by comparison with particular facts or by empirical generalizations obtained by observation or experiment. "This mode of philosophizing is not adequate to the exigencies of sociological investigation." It would lead, in practice, to the attempt to "construct a social science by deducing it from the laws of human nature, using the facts of history merely for verification"--since, in social phenomena the elementary laws are those of the psychology and ethology of the individual. Comte drew attention to the weakness of such a method, and indicated the way in which it was to be remedied. It might be possible to deduce sociological laws from the laws of human nature, for a society which was very simply organized and still "young." But beyond such a stage, the fact of social progression would render this method of "direct" deduction as practiced in the physical sciences null and void. The fact of social progression demands the method of "inverse" deduction. "As societies develop, their phenomena are

determined more and more, not by the simple laws of human nature but by the accumulated influence of past generations over the present." Human beings, on the laws of whose nature social phenomena depend, are not abstract or immutable essences, but individuals shaped and made what they are by the social environment in which they live. "It is one of the characteristics of the sciences of human nature and society to be conversant with a subject matter whose properties are changeable; not only do the qualities of individuals vary, but those of the majority (i.e., of a society) are not the same in one age as in another." This mutual interaction of individual and environment, together with the cumulative or progressive nature of the process, creates the methodological problem peculiar to sociology. "No powers of deduction would enable any one, starting from the conception of the human being man, placed in a world such as this was before the commencement of human agency, to predict and calculate the phenomena of his development as they have been."

Little progress could be made in such a project "until one had first ascertained, from an examination of the facts of history, the derivative law by which one social consensus generates another." But any such generalization, made from an examination of the facts of history would be merely empirical until correlated with the laws of human nature. Mill is not here arguing in a circle, as might at first appear. What he is saying is that the course of human history cannot be deduced from the laws of human nature alone. Such an attempt overlooks the fact of progression, i.e., of cumulative change in human nature and the societies composed of it. If the course of history were a cycle, and not a progression, this difficulty would not arise. Sociology might then proceed by direct deduction, after the manner of astronomy, by compounding the separate forces. But such not being the case, "we must reverse the deductive method of the physical sciences." In the physical sciences empirical generalizations are used to verify deductions made from the elementary laws. In social science, empirical generalizations from history suggest the law, which must <u>then</u> be <u>verified by deduction</u> from the psychological and ethological laws of human nature. Because of this interchange of rôle between empirical generalization and deduction, Mill calls this method, after Comte, the <u>inverse</u> deductive method. The direct deductive method is (1) calculation from known laws, (2) verification by checking with empirical generalizations. The inverse deductive method is (1) empirical generalization, (2) verification by deduction from known laws. In the direct method the deduction is verified. In the inverse method the empirical generalization is verified. "If laws of social phenomena, empirically generalized from history can be affiliated to the laws of human nature, if the actual develop-

ment of society can be seen to be such as the laws of human nature made antecedently probable, then the empirical generalizations are raised into positive laws and sociology becomes a science."

Strictly speaking, Mill's exposition of the inverse deductive method as the only procedure suited to detecting the uniformities of social change might have stopped at this point. Having explained the nature of an "inverse" deduction, i.e., the respective parts played by empirical generalization from history and deduction from the laws of human nature; and having indicated the necessity for such a method, he need not have gone further. But, in this method, so much depends on the "empirical generalization from history" to get things under way, that the nature and possibility of such a generalization cried aloud for further comment. If the facts of history do not give rise to any such empirical generalizations, then, obviously enough "a deductive study of history (i.e., of social laws) could never have reached higher than plausible conjecture." Do the facts of human history suggest any generalizations which have been or may be verified by subsequent deduction from the laws of human nature?

Mill's contention that the facts of history do afford the basis for at least one generalization is taken from Comte. (This, together with the conception of inverse deduction, constitutes his major debt to the positive philosophy.) There are five steps to the argument: (1) To obtain an empirical generalization from history we must not rest satisfied with merely noting the progressive changes exhibited by the elements of the social consensus. This would give us nothing but the relation between fragments of the preceding and succeeding consensus. We must combine a view of an entire cross-section of a social consensus with a view of such a slice in process of transition. "It is necessary to consider the progressive changes of the different elements and the contemporaneous condition of each." In this way we would arrive at an empirical generalization which would embody both the law of coexistence in a social consensus and the law of change. "This law, duly verified apriori, would be the real scientific derivative law of the development of humanity and human affairs." (2) The examination of the facts of history implied in reaching such a comprehensive generalization would be extraordinarily difficult. This difficulty would be considerably lessened if some one element of the social consensus dominated all others as the prime agent of social progression. For, if such were the case, we could then take the history of that one element as the index of all the others; as the "central change to each successive link of which the corresponding links of all other component progressions would be united." (3) Happily the facts of history do reveal one social element which is thus pre-eminent among the agents of social progression; namely, the

"state of the speculative faculties of mankind, including their beliefs concerning themselves and the world by which they are surrounded." To say this is not to imply that intellectual activity, the pursuit of truth, is one of the most potent propensities of human nature; nor that it dominates the lives of any save the exceptional few. It means, merely, that what men know or believe (i.e., think they know), at any time, determines to a great extent what they do. "The state of the speculative faculties, the character of the propositions assented to by the intellect, essentially determines the moral and political" and economic and religious and artistic state of the community. Every important social change, when not brought about by external conditions, has been preceded by a change in men's knowledge or beliefs. Each step forward in humanity's material progress has been preceded by an advance in knowledge. "Polytheism, Judaism, Christianity, modern philosophy and modern science have each been a primary agent in making society what it has been at each successive period." The fact, then, that men are not all devoted to the intellectual life, is no ground for denying that the progress of knowledge and belief has governed the progress of society. (4) If the order of social progression depends on the order of progression in the intellectual life of mankind--if there be any such--will be an index to the law of the development of society. "The order of human progression in all respects will depend on the law of the successive transformations of human options." Can any such law be detected? At first from history, empirically, and then verified by deducing it from the principles of human nature? Mill thinks there is a law governing the intellectual development of groups, and that it can be detected. But he warns any expectant seeker that it is necessary to take into consideration "the whole of past time from the first recorded condition to the phenomena of recent and present generations." The necessity for so doing arises from the fact that "the progress of knowledge and the change in opinions are very slow, manifesting themselves only at long intervals." Whence, "it cannot be expected that the general order of sequence should be discoverable from the examination of less than a very considerable part of the history of social progression." (5) This one important generalization which Mill, after Comte, regards as the fundamental law of intellectual development is the now familiar "law of the three stages." Speculation, on every subject of human inquiry, has three successive stages. In the first stage it tends to explain phenomena by reference to supernatural agencies; in the second, by metaphysical abstractions; in the third, by detecting uniformities of succession and similitude. "This generalization," Mill remarks, "appears to have that high degree of scientific evidence which is

derived from an empirical generalization of the facts of history verified by deduction from the constitution of the human mind."

Much as Mill is impressed by this "law" of intellectual progression running through social progression--"What a flood of light it lets in upon the whole course of history when its consequences are traced!"--he insists that its truth or untruth has nothing to do with the applicability of the inverse deductive method to sociological inquiries. Whatever decision "competent judges" may pronounce on any particular generalization from history that seems to be verifiable by deduction from the laws of human nature, the method is the only one by which the derivative laws of social order and social progress may be obtained. "By its aid we may succeed in looking far into the future and in determining what artificial means may be used to accelerate the natural progress so far as it is beneficial."

So much for the method proper to sociology in both of its branches of social statics and social dynamics. An extra chapter is required in the Logic to settle the methodology of the subsidiary sciences of political economy and political ethology. Comte, it will be remembered, had denied the status of science to such special studies, on the ground that no phase of the social consensus--in this case the laws of wealth--can be rightly understood apart from the rest. "The study of the conditions of national wealth is unphilosophical because all the different aspects of social phenomena act and react on one another and cannot be understood apart." Strictly speaking, Mill had no sound argument against Comte on this matter--he had dealt with Hobbes and Bentham in precisely the same terms--except to point to the writings of the economists as evidence of the possibility of a scientific treatment of economic phenomena. Hyperconsistency in the face of inconsistent facts was never one of Mill's outstanding characteristics. In spite of the fact that he had repeatedly stated that in these "abstract" sciences which deal only with one phase or law of human nature, "we can never affirm with certainty that a cause which has a particular tendency in one people or in one age will have exactly the same tendency in another," Mill was not prepared to exclude political economy from its place among the moral sciences. His exposition of the methodology of economics has been stated in some detail already in connexion with his essay on the definition and method of political economy. His opinions are substantially the same in the pages of the Logic, written some ten years later.* His remarks in the Sixth Book are of interest chiefly for the emphasis which they reveal on the "hypothetical" or "abstract" character of ratio-

*See pp. 27-29 of this dissertation.

cination in political economy. Of this point, more may perhaps be said. But for the moment one should notice the basis upon which Mill "makes room" for the doctrines of the classical economists. "Notwithstanding the universal consensus of social phenomena," he says, "whereby nothing which takes place in any part of the social process is without its share of influence on every other part," it is not the less true that different classes of social facts are in the main dependent "immediately and in the first resort on different kinds of causes, and therefore not only may but must be studied apart," just as in the human body we study separately the physiology of the principal organs and tissues though every one is acted upon by all the others, is, to use a more recent term, a function of the physiological consensus. On these considerations he is prepared to grant "the existence of distinct though not independent branches of sociological speculation." Political economy is one such "distinct though not independent" social science. Its phenomena are for the most part controlled by the single principle of "economic hedonism." By reasoning from this one "law of human nature" we may be enabled to explain and predict this portion of the phenomena of society "in so far as they depend on that class of circumstances only." As this "justification" of Ricardian economics is the principal object of Mill's observations in the Logic, it may be well to quote at length from a paragraph which brings most of the ideas together. He says:

> "The motive which suggests the separation of this portion of the social phenomena from the rest, and the creation of a distinct branch of science relating to them, is, that they do mainly depend, at least in the first resort, on one class of circumstances only; and that even when other circumstances interfere, the ascertainment of the effect due to the one class of circumstances alone is a sufficiently intricate and difficult business to make it expedient to perform it once for all, and then allow for the effect of the modifying circumstances; especially as certain fixed combinations of the former are apt to recur often, in conjunction with ever-varying circumstances of the latter class."

That portion of the Logic from which this account of Mill's conception of the methods of the moral sciences has been drawn seemed to me to reveal both a strength and a weakness of his ideas on this subject. "We may say of Mill," Prof. Graham has remarked in his English political philosophy,

> ". . . . in relation to sociology, that he had a very imperfect conception of the science he invoked; that he caught only partial and successive glimpses, without having a clear, consistent and steady conception of it. In this particular field his mind

was essentially barren; and though he has been praised for his discussion of the appropriate method of inquiry in the moral and political sciences, his views as to method are as uncertain as his view of the subject itself."

3. The Limits of the Moral Sciences

"If all the resources of sciences are not sufficient to enable us to calculate with complete precision the mutual action of three bodies gravitating toward one another, how," Mill asks, "can we expect to calculate the result of the conflicting tendencies which are acting in a thousand different directions and promoting a thousand different changes at a given instant in society?" Although Mill recurs to this question on several occasions, he did not devote a chapter to a systematic examination of its bearings on the possibility of a science of human nature and society. From scattered references, however, it is possible to indicate his general position on the question. He nowhere abandons his basic conviction that social-moral phenomena are controlled by "invariable laws." He does recognize the limits to a practical application of any findings based on this theory. He makes abundantly clear the inevitable nature of these limitations. And he insists time and again on the value of even approximate generalizations in this field. The passages in which these ideas are expressed seem to me to bring to a focus some of Mill's most characteristic views on the logic of the moral sciences.

In view of the rather drastic concessions which Mill makes, it is well to state again the theoretical reach of the moral sciences. The science of human nature, he says, "would have attained the ideal if it enabled us to foretell how an individual would think, feel, or act throughout life, with the same certainty that astronomy enables us to predict the movements and locations of the heavenly bodies." Elsewhere, in stating the case for the "true" doctrine of necessity he says that "given the motives present to an individual's mind and the character of the individual, the manner in which he will act might be unerringly inferred," and that "if we knew the person thoroughly and knew the inducements which are acting upon him, we could foretell his conduct with as much certainty as we can predict any physical event." The science of society, he says, in much the same terms, "would have attained a high perfection if it enables us, in any given condition of social affairs, to understand by what causes it had in any and every particular been made what it was; whether it was tending to any changes; what effects each feature of its existing state would probably produce in the future; and by what means any of those effects might be prevented, modified or accelerated." This predictability of

moral and social phenomena, in so far as it exists, rests on the triple assumption that individual thought, feeling, and action "obey" psychological and ethological laws; that social phenomena are nothing but the phenomena of individual human nature; and that, consequently, "the phenomena of society cannot but conform to fixed laws" derived from those of human nature.

Over against these statements of the "ideal" goal of a science of human nature and society, must be placed others that reveal Mill's very undoctrinaire insight into the limitations which practice actually imposes on theory. Referring to one of the passages quoted above, he insists that "nothing approaching this can be done. The actions of individuals could not be predicted with complete accuracy." And again: "There is no hope that knowledge of these laws, though as certain and complete as our knowledge of the laws of astronomy, would enable us to predict the history of society like that of the heavens for years to come." Elsewhere, he describes as "vain" the expectation that we could ever positively predict, from howsoever complete knowledge of the laws of the formation of character, the precise character which would emerge under specific circumstances.

Mill's frank acceptance of the limits within which prediction is possible in these fields rests on the threefold distinction, which he notes in several places, between (1) the fact that phenomena do obey laws, (2) the nature and operation of those laws, and (3) the nature of our knowledge of those laws. There is nothing to suggest that Mill ever doubted the existence of law in these fields. His analysis of the "logic" of these sciences aimed among other things to set forth his conception of the nature and operation of psychological, ethological, and sociological laws. But his theory of scientific method, of the way in which we obtain knowledge of such laws, necessitated a frank recognition of the limits of that knowledge. It is important, I think, to have these distinctions in mind in considering the limits which Mill is prepared to set to any science of human nature and society. These limits are of two sorts: (1) there may be some laws which we shall never discover; (2) there may be some events which we shall never be able to predict with complete precision, no matter how accurately we may have formulated the laws which operate to produce them.

Limitations of the first sort do not occupy Mill to any great extent. He says, for example, "The laws according to which a class of phenomena are produced may be few and simple. Yet their effects may be so various and complicated that it shall be impossible to detect any regularity among them." Where such is the case, those "few and simple laws" will necessarily remain undiscovered, although their presence may be strongly suspected. There may be

every reason to believe that a cloud of dust particles dancing in a shaft of sunlight are controlled by a few simple laws. Yet the manifestations of these laws are so varied and complicated that we are unable to detect any regularity among them. Mill sometimes emphasizes this limitation from the converse point of view: we may know what laws are operating in a particular case, but be unable to perceive them. We may "know" for example that the come-and-go of all the ideas that ever enter a man's mind is controlled by a few simple laws of association; but we may be quite unable to detect those uniformities in specific cases.

The second kind of limitation, which Mill emphasizes as inseparably connected with any science of human nature and society, arises out of the method by which our knowledge of laws is obtained. Ethology, economics, and sociology, he is never weary of repeating, are "abstract" or "hypothetical" sciences. They require us to preface our predictions by an "if." They consist entirely of formulations of laws which hold "if" counteracting circumstances do not interfere. This point has been mentioned elsewhere in other connexions. But it forms so integral a part of Mill's conception of the method of the moral sciences, that it may not be amiss to bring together his scattered references. "The science of ethology," to consider one moral science at a time, "is an exact science. Its generalizations are not empirical, not approximate; but express real laws." It is necessary, however, to recognize that ethological laws are hypothetical only. "They do not assert that something will always happen; but that a causal law will produce such and such effects if counteracting laws do not interfere." Since the knowledge of a law does not carry with it the knowledge that it will operate uncounteracted in any specific case, it follows that knowledge of laws, "though as certain and complete as our knowledge of the laws of astronomy," will enable us to predict tendencies only. Thus, "it is a scientific proposition that bodily strength tends to make men courageous, not that it invariably does so; that interest tends to bias the judgment, not that it invariably does so; that experience tends to give wisdom, not that it always does so. These propositions do assert actual tendencies, but tendencies which may be counteracted." Still referring to the limitations imposed on ethological prediction by the nature of scientific method, Mill insists that "even if our science of human nature were perfect, even if we could calculate the formation of character and the occurrence of individual feeling, from given data, we could neither predict nor generalize unless the data were all given"--which, Mill realizes, it never is. This unpredictability of ethological phenomena is not due to the fact that such phenomena are not caused, nor that the causes do not "follow invariable

laws." It arises out of the way in which such laws are detected and formulated in abstraction from the concrete situation where they operate in rerum natura. We get at tendencies, in the final analysis; and "when the question is one of compounding several tendencies and of allowing for all the causes happening in a specific case, we attempt a task beyond the compass of human faculties." What Mill says here of ethological laws, he says elsewhere of sociological laws. For example:

> "Sociology, a system of deductions apriori, cannot be a science of positive predictions, but only of tendencies. We may be able to conclude, from a knowledge of the laws of human nature applied to the circumstances of a given society, that a particular law will operate in a certain manner unless counteracted. But we can never be assured that it will not be counteracted. We can seldom know, even approximately, all the agencies which may coexist with it; and, still less, calculate the result of so many elements combined."

There is thus "no hope" that a knowledge of sociological laws "though as certain and complete as our knowledge of the laws of astronomy," would enable us to predict the history of society as we can predict the history of the heavens. The difference is not in the certainty of the laws. Astronomical laws are no more invariable than psychological, ethological, and sociological laws. The differential predictability is due to the nature of the data required for prediction. In astronomy the causes co-operating to produce a given effect are always few. This decreases the possibility of "counteracting" causes not known and so not taken into account in calculation; whereas, in the case of social phenomena, "although they may change according to law, the multitude of the cooperating causes is so great as to defy our powers of calculation."

If Mill is eager to point out the limitations to prediction based on psychological, ethological, and sociological laws, he is no less eager to insist that such limitations do not affect the "practical" value of the social sciences. He seldom, if ever, refers to the one without referring also to the other. Mill is never more characteristically himself than in such passages as begin by stating the theoretical reach of the moral science, proceed to emphasize their limitations, and conclude with reassurances of their "practical" value. This almost absurdly undoctrinaire quality of his work goes far to endear him to many of his readers. Following close on careful expositions of the radically unpredictable nature of social-moral phenomena, we are told, for example, "An amount of knowledge insufficient for prediction may be most valuable for guidance"; "It is no more necessary to the wise conduct of society, than for one's private affairs, that we be able to foresee infal-

lible the effects of causes"; "In social enquiries an approximate generalization is equivalent, for all practical purposes, to an exact one"; "It is no discredit to the science of human nature that its propositions are for the most part only approximately true." One hesitates to dwell upon a point which is so obvious; but it seems to me that the recent development of "statistical laws" in the social sciences does go hand in hand with Mill's threefold conviction that in such fields there <u>are</u> invariable uniformities, that we can nevertheless only predict tendencies, and that such power is of considerable value. For in these matters we are forced to seek our objectives by means that may be defeated, and to take precautions against dangers which may never be realized. Under such conditions a degree of knowledge far short of the power of completely accurate prediction is often of considerable value. Great power of control may go hand in hand with imperfect knowledge of all the laws operating in particular instances. "It is enough to know that certain means tend to produce certain ends, and that others tend to frustrate them."

APPENDIX

TWO PROBLEMS: FREEDOM AND PURPOSE

Mill's belief in the possibility and desirability of a "science of human nature and society" forced him to consider, however briefly, two very old philosophical problems. The first of these was the question of "free-will." How is a "science" of human nature, a search for its invariable laws, compatible with the popular conception of voluntary action? Is that "consciousness of freedom," which we find in ourselves but do not impute to physical objects, a mere illusion? If it is not an illusion, does it not introduce a radically unmanageable factor into the attempt to predict human action? If, on the other hand, it is merely an illusion, if all human action is "inevitably determined," is not the hope which inspires Mill's conception of an adequate science of human nature and society somewhat misguided? Of what use would a knowledge of astronomy be to the stars?

The second problem, less obvious perhaps but more pressing in the end, was the general question of "ends" and "values." The power to predict and control the formation of character and the organization of society would, if it were once attained, raise in acute form the problem of what kind of individual and society it is best for us to have. Psychology, ethology, sociology are, to use Mill's words, "subordinate to teleology, or the doctrine of ends."

These two problematic corollaries of the proposal to deal "scientifically" with human nature and society did not weigh very heavily on Mill's philosophical conscience. The first he sweeps aside as superstition. The second he settles, to his own satisfaction, in half a page. But the ideas which he brings to bear, in both cases, are interesting and pointed.

At the end of his introductory chapter he "pauses" to consider "an objection which, if not removed, would be fatal to the attempt to treat human conduct as a subject of science." The objection, stated in the form of a question is this: "Are the actions of human beings subject to invariable law? Does that uniformity which is the foundation of every scientific theory really obtain among them?" His answer is an emphatic affirmative: "Given the motives which are present to an individual's mind, and the character of the individual, the manner of his action might be unerringly

inferred." Again: "If we know a person thoroughly and knew all the inducements acting upon him, we could foretell his conduct with as much certainty as we can predict any physical event."

Mill does not attempt to prove the proposition. Many pages in his Logic would have risen in protest. His method is the somewhat easier one of criticizing objections to such a belief. His arguments are essentially these two: (1) The predictability of our conduct does not conflict with our freedom. We are not less free because an intimate friend may have reason to be certain what use we shall make of our freedom. Indeed, we regard any doubt he may have as a mark of his ignorance of our nature. Theologians who have argued that man's will is free have, none the less, held this freedom to be consistent with God's foreknowledge of our actions. "If it is consistent with divine foreknowledge it is consistent with any other foreknowledge." (2) The "problem of free-will" is created by a gross misunderstanding of the nature of causation. In causal connexion there is nothing but invariable and unconditional succession. The most painstaking analysis made, e.g., by Hume, and again by Thomas Browne, reveals nothing more. But it is popularly supposed that there is some more intimate connexion between a cause and an effect, some "peculiar tie," some irresistible constraint. This conception is simply false. Such a belief would destroy our freedom, and contradict our sense of freedom; would paralyze our efforts after self-control and commit us to a complete fatalism. If such a conception of causation underlies determinism, then human action is not determined. And, what is more, no other events and processes are determined. If such were the correct meaning of "necessity" it would be truer to say that physical phenomena do not exhibit necessity, than to say that social-moral phenomena do. The application of so improper a term as necessity, so defined, to the relation between cause and effect in general, and between motive and act in particular, is a "most signal instance of the abuse of terms." The practical consequences of this misconception "is one of the most striking examples of the power of language over ideas. The subject will never be understood until that objectionable term is dropt."

Before quitting this subject of the causation of human action Mill desires to rid his readers' minds of another misconception. "When the will is said to be determined by the motive, the 'motive' does not mean always or solely the anticipation of pleasure." Psychological hedonism is not adequate to the facts of human experience. "Among the causes of our volitions must be reckoned not only likings and aversions, but also purposes." This denial of the famous opening sentence of Bentham's Principles, anticipating somewhat also Sidgwick's position in the Methods of Ethics, is rather interesting

in the light of what Mill implied later in his Utilitarianism. "It is," he repeats, "only when our purposes have become independent of the feelings of pleasure or pain . . . . that we can be said to have a confirmed character." It is this kind of a character, "fashioned above pleasure and pain," that "does not desert the moral hero even when the reward he receives is anything but an equivalent for the suffering which he undergoes."

It is difficult to feel, in reading his chapter on "Liberty and Necessity" that Mill himself took the problem very seriously. He was doubtless aware that others would do so. The case of Mansel,[14] to mention only one, would have confirmed such an anticipation. But the mood which inspired the entire Logic, and Book Six in particular, was not one which would have caused him to feel much interest in what he had come to believe was largely a matter of correctly understanding the meaning of a word. His statement of the case agreed with "the best philosophical authorities"; and that was sufficient. The question of ends and values, as raised by the prospect of a science of human nature and society, he could not dismiss so lightly. It involved two convictions that animated his whole conception of these projected sciences. The first of these, echoed so audibly in Dewey's Human Nature and Conduct, was that any worth while measures of moral and social reform must rest on a scientific understanding of human nature and society.

"The reasons of any maxim of policy," he says, rather cryptically, "can be no other than the theorems of the corresponding science." Much of his language is quaint and metaphorical, but the meaning is unmistakable. The following quotation, in which he is describing the relation between the projected "political science" and the "political art" which it makes possible, needs only to be "translated" to describe our contemporary conception of "scientific" social reform.

> "The (political) art proposes to itself an end to be attained, defines the end, and hands it over to the (political) science. The science receives it, considers it as a phenomenon to be studied, and having investigated its causes and conditions, sends it back to art with a theorem of the combination of circumstances by which it could be produced. Art then examines these combinations of circumstances,and, according as they are or are not in human power, pronounces the end attainable or not."

A dozen quotations might be made to the same effect. When circumstances permit, nothing can "supersede the propriety of going through the scientific process requisite for framing a policy from the data of the particular case before us." We must avoid that "habitual error" of those who would "deduce a line of conduct

proper to particular cases from some supposed universal practical maxims." We must never overlook "the necessity of constantly referring back to the principles of science in order to be sure of attaining the end in view." Could words express more clearly the difference between "scientific procedure" and "muddling through":

> "After framing the conception to be aimed at, and determining the conditions on which that effect depends, there remains to survey the resources which can be commanded for realizing these conditions. The results of this survey, embodied in a few general propositions will constitute the general scientific theory from which practical methods will follow as corollaries."

I have extended these quotations, perhaps unduly, because they reveal so unmistakably the motive which lay back of Mill's enquiry into the logic of the moral sciences; and because they serve to "set" more clearly the general value-problem of determining the "ends" which "political art proposes to itself and hands over to political science."

The choice of ends, as Mill perceived, is not a matter of science. "The definition of the end belongs exclusively to art, and forms its peculiar province." Every art, to borrow his very Aristotelian terminology, has one first principle, not borrowed from the corresponding science. The builder's art assumes that it is desirable to have buildings; the architect's art, that it is desirable to have them beautiful. Every art combines laws disclosed by science and a general principle of teleology. "The most elaborate and well digested body of laws of mental and social phenomena will be of no avail if the ends to be aimed at are taken for granted without analysis." This points directly to the need for some "first principle of conduct, some standard by which to determine the goodness or badness of ends proposed." And whatever that standard is, "There can be but one; for if there were several, we would then need some more general principle as umpire." The nature of this "ultimate moral principle" is not argued out at any length. The supposition of a "moral sense" is settled at once as "inadequate," and "without attempting in this place to justify my opinion, or even define the kind of justification it permits of, I merely declare my conviction that the general principle to which all rules of practice ought to conform, is that of conduciveness to the happiness of all sentient beings." In other words, the promotion of happiness is the ultimate principle of teleology and the goal of the moral sciences.[15]

CONCLUSION

THE PROBLEM IN RETROSPECT

The preceding chapters of this study have been concerned with Mill's treatment of two problems: (1) Are the phenomena of "human nature and society" exceptions to the "uniformity of nature"? (2) Are the methods by which we are able to detect the uniformities exhibited by physical phenomena applicable to social-moral phenomena?

In the first chapter the reasons for Mill's interest in this problem were noted; the social conditions, the naturalistic tradition in which he was raised, the criticism of his father's political theory by Macaulay, the eulogy of science and scientific method by Herschel. Chapter Two dealt with Mill's attempt to determine what precisely is implied in the conception of "nature" as the object of scientific investigation; and what precisely are the methods employed by the physical sciences. Chapter Three indicated the manner in which Mill brought these findings to bear on the possibility and method and limits of a science of human nature and society. An appendix to Chapter Three described the way in which Mill sought to deal with the question of free-will; and the relation, in his mind, of our knowledge of how phenomena in this field do behave to our convictions of how they ought to behave.

Two lines of reflection suggest themselves by way of conclusion. What, in the first place, is the purely historical significance of Mill's chapters on the "logic of the moral sciences"? Secondly, what positive contribution, if any, did they make to that body of thought which has since grown into modern social science? The answer to this second question tends inevitably to take the form of an explanation of the almost total neglect of Mill's ideas by subsequent writers in this field.

(1) By the "purely historical significance" of Mill's work on the logic of the moral sciences I mean to suggest a perspective which directs attention to the epoch out of which it grew and for which Mill was in so many ways the final spokesman. This great tradition, it seems to me, is most adequately described by the term "Newtonism"; in the same way in which a subsequent tradition is most adequately described by the term "Darwinism," or more generally, evolutionism. Mill's chapters reflect the impact of the Newtonian conception of nature and scientific method on the study

of human nature and society. His conviction that all phenomena, and therefore the phenomena peculiar to this field, obey "invariable laws" derived its strongest support from the prestige enjoyed by eighteenth and early nineteenth century physics and astronomy. The "order of nature" which is analyzed in Book Three of the Logic is emphatically the "nature" which is presupposed and suggested by physics and astronomy. The peculiar articulation of the moral sciences, each aiming to formulate secondary laws derived from simpler laws and all tracing back to one set of primary laws, is worked out with one eye on the central position of gravitation in the classical mechanics. The deductive method, which he strove to justify in the proposed moral sciences, was, in his own words, the method of physics and astronomy supplemented slightly by Comte's suggestion of inverse deduction.

To appreciate the reality of this "Newtonian" background to Mill's speculations on the moral sciences, it is necessary to roll back the history of science rather more than might be supposed. In the England of 1830-1840 the "physical sciences" included little beyond the classical mechanics; and, in the minds of most persons, this "natural philosophy" was limited to such bold deductive triumphs as had marked the development of astronomy and terrestrial physics. Such striking inferences, e.g., the speed of light, were the standard by which all others were judged. Scientific method was, literally, the method employed in these cases. In the moral science group the classical economics was equally supreme, in both method and results. At the time Mill was working out Books Three and Six of the Logic, the "social science" which was not absorbed into economics (or refuted by it) was disregarded as too hazy to deserve attention. Ricardo's striking deductions had made a priori reasoning as well known here as in the physical sciences. Deductive reasoning was perhaps never more popular than when Mill began his work. (Hence his painstaking critical analysis of the syllogistic "deduction"--so valuable a term could not be allowed to waste its significance in such barren fields.) Like everyone else, Mill was under the spell of this apriorism. His self-imposed task was primarily to widen the scope of the method in such a fashion as to bring social-moral phenomena within its reach. "His original scheme," Professor Patten has remarked, in the penetrating analysis of Mill's logic contained in his Development of English Thought, "was to strengthen social speculations by showing that the method used in them was the method of physical science."

The gist of the "organon" of the moral sciences which Mill finally wrought out on the model of Newtonian physics, is built around a few fundamental theses. These may be condensed

as follows: (1) The phenomena of human nature and society exhibit uniformities. (2) These uniformities, no matter how complex, derive from and must be resolved into a few basic uniformities, the "elementary laws of human nature," probably the laws of association. (3) These uniformities, except the most elementary, can be detected only by the use of the deductive method. (4) These uniformities, to be properly understood, must be taken in what Merz has called their "togetherness," in what Mill calls their "consensus"; must be conceived as exhibiting certain limited mutual correlations which determine for any society the nature of the coexistences and successions which its phenomena assume. (5) These uniformities, although invariable, can only be formulated as "tendencies" because of the selective or abstractive nature of the method by which they are isolated. (6) These uniformities are invariable but not "necessary" in any fatalistic sense--they are the basis of any intelligible conception of "moral responsibility." (7) These uniformities (to borrow a phrase from Aristotle), are the "matter" of which a sound ethics provides the "form"--moral and social teleology, to be of any use, must be grounded on moral and social science. When Mill's chapters are condensed thus into half a dozen propositions, they suggest that inevitable, and considerably wider question; namely: What positive contribution do they represent to the social science which has developed since Mill's day?

(2) I have suggested that this question leads one into a species of philosophical apologetics: the plain fact is that Book Six has never at any time received from subsequent social philosophers even a tithe of the attention accorded to the rest of the treatise by logicians and epistemologists. This neglect constitutes a kind of anomaly in the history of nineteenth century social thought which calls for some examination. It is hardly necessary to add that it leads also to very difficult historical speculation: it is never easy to state, with any degree of certainty, what a man's influence has been. By way of conclusion, I shall offer some remarks on this twofold problem: What positive influence may be attributed to the sixth book of Mill's Logic? What explanation can be offered for its neglect at the hands of his successors?

(a) There are four points emphasized by Mill which, it seems to me, were important at the time and under the conditions they were made. In the first place, his chapters on the moral sciences contain, if not the first, at least the most emphatic and systematic, criticism of that point of view which would regard human nature and society as intrinsically incapable of scientific treatment. Thanks to the prestige of the physical sciences, this particular form of obscurantism was neither so strong nor so wide-

spread as it had been, for example, at the time Hume proposed to "introduce the experimental method of reasoning into moral subjects." Mill wrote for a more enlightened generation; but one which which cherished, in some of its members at least, conceptions which stood in the way of a whole-hearted acceptance of the postulate of uniformity among social and moral phenomena without which the "scientific spirit" could not enter into and take possession of that field. Mill's chapters seem to have cleared the air of these cultural lags, at least for serious students of human nature and society. So far as my knowledge extends, the growth of the moral sciences was not blocked thereafter by any considerations of free-will, miracles, divine control, etc. This claim of uniformity, however modest an achievement it may appear in retrospect, was important at the time it was made. And Mill made it once and for all.

A second point upon which Mill insisted with great timeliness is that a science of society is not exhausted by a science of economics. It is only by an effort of the imagination that one can recapture the intellectual milieu in which these homely truths do not appear as truistic as they do today. Just as there were among Mill's contemporaries many who were prepared to discredit the very notion of a social science, so there were many who regarded the possibilities of that science as limited to the study of society in its economic aspects. Mill's pages put an end to this conceit. However fantastic his proposed extensions may appear, the point is they were definite proposals to extend the range of social theory, based on his recognition of the fact that one aspect of society is not all of society. His conception of the "social consensus" implies, among other things, that economics is not the whole story. His emphasis on the limited perspective afforded by the classical economics, made at a time when Ricardo was crescent and Adam Smith's broader conceptions were temporarily forgotten, has been abundantly justified by the rich and varied growth of subsequent social science. His vision of the social consensus is, in many ways, one of the most fruitful suggestions in the book. A very large portion of present-day sociology is precisely the attempt to determine the nature of that web of forces and institutions which we call a community; to detect, in Mill's language, the mutual correlations, the "statics" and "dynamics" of social groups.

If there is any one suggestion advanced by Mill which has met with less neglect and more criticism than the others, it is his proposal for a scientific investigation of the laws of character formation. Mill "on the logic of the moral sciences" has meant, for most people, his projected "ethology." The references

to this subject are almost uniformly critical, not to say contemptuous. James Ward's once celebrated article is more extended than any other known to me, but its tone is typical: Mill's idea was sheer moonshine. Now, the actual language in which Mill sets forth his conception of the method and scope of ethology is perhaps a trifle fantastic. But, like so many of his ideas, the conception which underlies the proposed ethology is, it seems to me, thoroughly sound in principle. What Mill saw, and what his elaborate references to "middle principles" finally amounts to, is the important fact that human nature is (to use Dewey's words) a function of the environment. The uniformities of character formation are ways in which individual and environment interact. This simple consideration enabled Mill to restate the problem in terms which revealed at once the inadequacy of the individualistic association psychology. Laws of contiguity, frequency, intensity, etc., simply do not get as far as the concrete environmental factors which are constantly shaping the individual character. They do not suggest the perspective which is implied in such a phrase as "human nature and the social order"; whereas Mill's chapter on the need for, and scope of, ethology gives just this turn to the enquiry.

Another point which reveals Mill's grasp of the subject-matter of Book Six is his constant reiteration that although social-moral phenomena obey invariable laws, our investigation of those laws will never enable us to predict more than "tendencies." He has several reasons for this conviction; but the most important of these, it seems to me, derives from his analysis of the nature of the mind's activity in scientific investigation. This activity, as Mill describes it, is essentially one of abstraction, selection, isolation. This holds for physics no less than for psychology and economics. Scientific investigation--all rational enquiry if you will--is in its very essence a process of separating one aspect of reality. The significance of this "abstractive" procedure is perhaps most obvious in economics, where attention is deliberately directed to one phase of the social process. The conclusions attained under such conditions are, as Mill is never weary of repeating, "hypothetical" in their nature. They hold only of one aspect of a community; and as no aspect ever exists in isolation, they presuppose an introductory "if." This relation between "reason" and "nature" obtains in every field. Even in mechanics, "all the resources of science are not sufficient to enable us to calculate with complete precision the mutual action of three bodies gravitating toward one another." Generalized, this points, in Mill's language, to the fact that we can predict only "tendencies." We formulate "laws" only after we have actually or conceptually isolated the particular uniformities to which they refer. This dis-

crepancy is widest between a social law and an actual social process: the abstraction is here most obvious and "violent." Prediction in these fields to a greater extent than elsewhere, must be introduced with provisos: "If no disturbing factors interfere," this law will be exhibited. But the possible disturbing factors are so numerous that such laws never enable us to state more than "tendencies."

The emphasis upon such points--the postulate of uniformities in moral-social phenomena, the partial nature of any science (e.g., economics) which considers only one phase of the social process, the overarching conception of the social consensus, the interaction between individual and environment in the formation of character, the hypothetical nature of sociological prediction, etc.--at the time and under the conditions obtaining when Mill wrote his Logic, constitutes, I think, the principal contribution which his chapters may have made to subsequent social thought. Taken together, they seem to indicate that Mill had grasped many of those rudimentary and essential concepts which get built into the early stages of any science. I can see no reason for crediting Mill with any "discoveries" in these sciences; nor for believing that his pages contributed directly to any subsequent discoveries. His whole Logic did no more than make its readers aware of the nature of scientific method. Such knowledge, I suspect, has always played a negligible rôle in the growth of science. But it bestows upon its possessor a grasp of the nature of science which years in a laboratory or in the field is seldom enough to make clear. This arm-chair philosophizing on the very general problems of a scientific investigation of human nature and society, while it may never lead anyone to detect a single law, may often be a powerful factor in turning the time and energies of practicing scientists into more fruitful channels. Whether Mill's chapters on the logic of the moral sciences had any such effect is, as I suggested before, a matter of very delicate historical speculation. But I see no reason, apart from the absence of biographical statements, for believing that they may not have done so. Mill's pages, it seems to me, were admirably calculated to exercise precisely this kind of influence during the thirty or forty years after their publication.

(b) These considerations give an added point to the second historical problem which suggests itself when one views the sixth book of the Logic in retrospect. Why was it, apparently, so stillborn? Why do we hear so much of Comte's chapters on this subject, and so little of Mill's? Why does a fairly careful search of the relevant literature reveal a mere handful of references to Mill's ideas on this topic? Why have his ethics, his logic, his epistemol-

ogy, his economics, his politics, his metaphysics provoked so much more discussion than his views on a possible science of human nature and society? There are, I think, three probable reasons for this neglect.

In the first place, Mill's chapters on the moral sciences form the conclusion to a work which had, ostensibly, little or nothing to do with moral science. Had they formed an introduction or an appendix to a treatise on sociology or any of the special social sciences, their subsequent influence would, I think, have been more pronounced. Moreover, the challenging nature of the logic and epistemology embodied in the rest of the volume seems, from the first, to have concentrated attention upon the chapters in which these matters were worked out. The immediate recognition which the book won among Cambridge logicians, and the subsequent criticism which it provoked among Oxford logicians, kept it before the learned world as chiefly a work on logic and theory of knowledge. Those of its readers who would be interested in its criticism of the syllogism, its theory of inference from particular to particular, and even its general analysis of scientific method, would not be likely to regard Book Six as anything much more than a curious appendix. And conversely, those who might have found food for thought and matter for comment in Mill's general conception of the moral sciences would least expect to find such substance in a System of Logic. To attempt to suggest why the course of history was not different is at best a highly speculative procedure; but it is sometimes the case, I believe, that such accidental factors as the one just noted, have been to a considerable extent responsible.

Secondly, Mill seldom if ever refers in his subsequent writings to what he had written on the moral sciences. This silence may be due to disappointment which met his efforts to create the science of ethology. But whatever the reason, the readers of his later and more widely known treatises were not reminded of any connexion which may have existed in Mill's mind between his early pages on the principles and problems of social science and his later pages on the principles and problems of social control.

Lastly, and perhaps most pointedly in this connexion, Mill's ideas on the moral sciences came before the public in categories which were soon to be replaced by those introduced by such writers as Darwin and Spencer and Bagehot. The "Newtonism" which supplies the inner logic of Mill's exposition of the articulation and method of the moral sciences gave way in less than a generation to a "Darwinism" which gave "society" an entirely new connotation. Evolutionism not only directed the mind of the sociologist into new hypotheses and new temporal perspectives, it altered radically the

relation between the individual and the group which is implied in much of what Mill wrote. The stark social atomism which animates Mill's proposal to trace all sociological laws back to a few elementary laws of individual human nature, could come to no terms with the "organic" conception of social evolution which has controlled so much of the thinking along these lines since Mill's time. The change of viewpoint, for example, between Mill's Logic and Bagehot's Physics and Politics, is of such a nature that Mill seems to be talking almost a dead language. On Mill's terms the social "consensus" was, in the last analysis, a "function" of individual human nature. This atomism is fundamental to the moral sciences which he proposed. It is simply reversed by post-Darwinian thought, in which the individual is conceived to be a "function" of the social group. Had Mill developed more consistently the conception of "consensus" which he makes so central to the study of society, he would have found himself hard pressed to retain the rigid individualism which he had taken over from Bentham and the elder Mill. But the transition, which seems so inevitable and logical, was never made. So far as the Logic is concerned, the whole framework of a science of society turns on the science of the individual. This intellectual "lag" from the eighteenth century may account, to a greater extent than any other factor, for the comparative neglect which Mill's chapters on the logic of the moral sciences have met at the hands of his posterity.

NOTES AND REFERENCES

Notes to Introduction

[1] In her Modern Introduction to Logic, p. 332.

[2] The same perspective has been suggested by several others. Stephen, for example, remarks: "The great aim of the Benthamites had been to apply scientific methods to all the problems of legislation, jurisprudence, economics, ethics and philosophy. Admitting that a vast body of knowledge had been obtained in the physical sciences, we may ask how it had been gained, and proceed to apply the methods to the moral sciences. In its origin the task (attempted in Mill's Logic) was an attempt to give an organized statement of sound philosophy in a form applicable to social and political speculations" (The English Utilitarians, Vol. III). Bain writes: "The sixth book of the Logic was the outcome of his long study of politics, both practical and theoretical, to which the finishing stroke was given by Comte" (J. S. Mill: A Criticism, p. 68). Graham, in describing Mill's attitude in the Logic, says: "Here then are the routes to truth and certain knowledge. Why not apply these methods to the discovery of truth in the moral and political sciences, and to the testing of the conclusions which we already hold?" (English Political Philosophy, p. 276.)

[3] In his Principles of Logic.

[4] That he meant to connect his discussion of this problem with the rest of the Logic is clear from the final paragraph in the preface to the first edition: "The concluding book is an attempt to contribute towards the solution of a question, which the decay of old opinions, and the agitation that disturbs European society to its inmost depths, render as important in the present day to the practical interest of human life, as it must at all times be to the completeness of our speculative knowledge: viz., Are moral and social phenomena really exceptions to the general certainty and uniformity of the course of nature; and how far are the methods by which so many of the laws of the physical world have been numbered among truths irrevocably acquired and universally assented to, applicable to the formation of a similar body of received doctrine in the moral and political science."

[5] In his Philosophy of 'as if,' p. xxx.

[6] His words are very pointed: "Il est possible de procéder lorsq'on étudie la nature de l'homme individual et social, comme procéde, en d'autres matières, le physician, et d'appliquer la méthode newtonniene à la détermination d'un nombre aussi petit que possible de lois génerales et simples, qui, une fois découvertes, permettront d'expliquer, par voie synthétique et deductive tout le detail des phénomènes. Il est possible, par suite, de fonder sur ces connaissances une science pratique, d'entendre nôtre pouvoir dans la même mésure ou nous entendons notre faculté de prévoir. Étant constituée une science de l'âme et une science de la société, qui présentent le caractère de science à la fois expérimental et exactes, analogues à la physique newtonniene, pourquoi ne pas fonder, sur ces disciplines nouvelles, une morale et une legislation scientifique, achèvement de la science pratique universelle? Newtonianisme applique aux choses de la politique et de la morale" (Evolution de Radicalisme philosophique, Vol. III, pp. 3, 4).

Notes to Chapter I

[1] To be found principally in Vol. I of his Dissertations and Discussions, in Vol. I of his Letters, and in Bain's J. S. Mill: A criticism.

[2] Logic, Book vi, Chapter vi.

[3] Logic, Book vi, Chapter x.

[4] See note 6 to Introduction.

[5] It has been rather pointedly defined by Bain as follows: "The theoretical science of society, sometimes called the philosophy of history, is the accounting on general principles of cause and effect for the actual course of political events, the growth of institutions, the progress and decay of nations. History recounts these things in detail. The philosophy of history generalizes the agencies at work and endeavors to present the whole as following out great leading ideas" (Logic, Inductive and Deductive [1870]).

[6] In his Six Books of a Commonweale, p. 454.

[7] In his Six Books of a Commonweale, pp. 559, 560.

[8] See Flint's Philosophy of History, p. 286.

[9] But the following is very pointed: "Si l'homme peut prédire, avec une assurance prèsque entière, les phénomènes dont il connaît les lois; si lors même qu'elle lui sont inconnus, il peut, d'après l'expérience, prévoir avec une grande probabilité les événements de l'avenir; pourquoi regarderait-on comme une entreprise chimérique, celle de tracer avec quelque vraisemblance le tâbleau des destinée future de l'espèce humaine, d'après les resultats de son histoire? Le seul fondement de croyance dans les sciences naturelles, est cette idée, que les lois générales, connues ou ignorées, qui règlent les phénomènes de l'univers, sont necessaires et constant; et par quelle raison ce principe serait-ils moins vrai pour le développement des facultés intellectuelles et morales de l'homme, que pour les autres opérations de la nature? Enfin, puisque des opinions formées d'après l'expérience sont la seule règle de la conduite des hommes les plus sages, pourquoi interdirait-on au philosophie d'appuyer ses conjectures sur cette même base, pourvu qu'il ne leur attribue pas un certitude supérieure à celle qui peut maître du nombre de la constance, de l'exactitude des observations?" (Condorcet, Esquisse d'un Tableau Historique des Progrès de l'Esprit Humain.)

[10] For discussion and summary, see Flint's Philosophy of History, p. 403.

[11] See Brett's History of Psychology, Vol. II, under Hobbes.

[12] In his Enquiry concerning Human Understanding, Section 3.

[13] In his Enquiry concerning Human Understanding, Section 1.

[14] See the Logic, Book vi, Chapter ii.

[15] See Bain's Mill, Chapter ii.

[16] See Warren's History of Association Psychology.

[17] See Warren's History of Association Psychology.

[18] The following passage is of capital importance in this connection. Writing to Malthus, Ricardo describes his method in these words: "My object was to elucidate principles, and to do this I imagined strong cases that I might show the operation of those principles. I never thought e.g. that practically any improvements took place on the land which would at once double its

produce; but to show what would be the effects of any improvements, undisturbed by any other operating causes, I assumed an improvement to that extent. And I think I have reasoned correctly from such premises" (Letters, p. 167).

[19] All references in this chapter are to Mill's Autobiography and Bain's Mill, in so far as they bear on the facts of Mill's education, early writings, and associates.

[20] These reviews of James Mill's Essays appeared in the Edinburgh Review for 1829. They were subsequently reprinted in the Collected Essays, Vol. I.

[21-25] All quotations from the three articles by Macaulay. They are to be found in the files of the Edinburgh Review, or in the first volume of any edition of his collected essays.

[26] In the Autobiography, Chapter v.

[27] So far as I know, the sources from which Minto drew his data are not available in the university libraries of this country. His article on Mill in the 11th edition of the Encyclopedia Britannica does not give precise references to sources.

[28] From Minto's article.

[29] See Autobiography, Chapter v.

[30] In his Letters, Vol. I.

Notes to Chapter II

[1] All references for quotations made directly from Book Six of the Logic are omitted. They are too numerous and too easily located in the hundred or so pages of the Logic to merit documentation.

[2-3] See note 1 above.

[4] See note 3 to Introduction.

[5] See note 3 to Introduction.

[6] From Autobiography, Chapter v.

[7] See note 18 to Chapter i.

[8] See note 1 above.

Notes to Chapter III

1-4 See note 1 to Chapter ii.

5 See Courtney's Mill, p. 88.

6-10 See note 1 to Chapter ii.

11 See note 21 to Chapter i.

12 See note 21 to Chapter i.

13 See note 1 to Chapter ii.

14 See his Prolegomena Logica, Appendix D.

15 This point was developed at length by Mill in his Utilitarianism.

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Secondary Material: Some relevant sources in Mill's contemporaries

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2. Macaulay, T. B. "Mill on Government," Edinburgh Review, 1829. Reply to Westminster reviewer's defense of Mr. Mill, Edinburgh Review, 1829. "The Utilitarian Theory of Government," Edinburgh Review, 1829.
3. Anonymous. "A Defense of Mr. Mill," Westminster Review, 1829.
4. Ricardo, D. Principles of Political Economy and Taxation. 1817.
5. Comte, A. The Positive Philosophy, 1830-1842.
6. Herschel, J. F. W. A Preliminary Discourse on the Study of Natural Philosophy. 1830.
7. Whewell, W. History of the Inductive Sciences. 1837.

Note: This list could be extended indefinitely. Mill read widely in the literature of his day. The titles given here are of books in which principles of method are discussed or exemplified.

Tertiary Material: (1) Writings on Mill's logic of the moral sciences

1851. Mansel, H. L. Prolegomena Logica, Appendix D.
1866. Alexander, P. P. Carlyle and Mill.
1870. Ribot, T. La Psychologie Anglaise Contemporaire. Pp. 87-144.
1882. Bain, A. J. S. Mill: A Criticism. Especially Chapter iii.
1882. Bonar, J. Philosophy and Political Economy in Their Historical Relations.

1883. Minto, W. Article on J. S. Mill in Encyclopedia Britannica.
1890. Ward, J. "Mill's Science of Ethology," IJE, Vol. I.
1899. Patten, S. N. Development of English Thought. Pp. 318-43.
1900. Stephen, L. English Utilitarians. Vol. III.
1900. Graham, W. English Political Philosophy. Pp. 271-313.
1900. Grote, J. Exploratio Philosophica. Vol. I.
1906. Rickaby, J. Free Will and Four English Philosophers. Chapter iv.
1914. Wust, P. J. Mill's Grundlegung der Geistwissenschaften.
1914. Davidson, W. L. The Utilitarians from Bentham to J. S. Mill. Pp. 170-88.
____ Ashley, W. "Introduction" to an edition of Mill's Political Economy.

Tertiary Material: (2) Writings on the problem of method in the social sciences

1858. Cairnes, J. E. The Character and Logical Method of Political Economy.
1866. Venn, J. The Logic of Chance and Its Application to Moral and Social Science.
1870. Bain, A. Inductive Logic.
1874. Jevons, W. S. The Principles of Science. Pp. 759-61.
1889. Venn, J. Empirical Logic.
1891. Keynes, J. N. The Scope and Method of Political Economy.
1924. Knight, F. H. "The Limitations of Scientific Method in Economics." (Contribution to Tugwell's Recent Trends in Economics.)
1929. Rueff, J. From the Physical to the Social Sciences.
1931. Cohen, M. R. Reason in Nature.